THE IRON TRADE REVIEW

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HIGH PRICES

CAUSE SOME PIG IRON BUYERS TO HESITATE,

But Orders Are Still Heavy — Advances in Prices of Sheets and Tin Plate.

The great activity of furnaces and mills which has prevailed for several months, with steadily increasing production, has been in spite of comparatively little buying from the railroads. It is now apparent that much heavier buying of railroad equipment will be necessary, and it seems certain that the iron and steel demand next year will be tremendous. Already the ore movement has been impeded by shortage of cars, and if present prosperity continues and the railroads do not make record breaking purchases, the country will witness the worst congestion on the railways in its history. Although tremendous buying is thus in prospect, the danger, to which we referred last week, of advancing prices too rapidly, still exists. Heavy buying of pig iron has continued in some districts, notably in Pittsburg and New York; but a very noticeable slowing-up in Philadelphia and the marked hesitancy of Cincinnati buyers come as timely warning to manufacturers to consider well before doing anything that may interfere with the full fruition of great expectations.

New Records

September, although having only 30 days, will set new records in pig iron and ingot output for the U. S. Steel Corporation. The production of pig iron will amount to about 1,140,000 tons.

Improvement in Germany

For the first time since the panic of 1907, our correspondent at Dusseldorf is able to report an improvement in German iron and steel markets. The depression in Germany was extremely severe, and no indication of recovery had been noted previous to this report. Improvement of conditions in England continues. The pig iron prices are considerably higher.

Billets

In spite of a great deal of talk about the scarcity of billets, they are still obtainable at from $26 to $27, Pittsburg. An unusual ocurrence has been the sale now and then of open-hearth at a lower price than Bessemer. Several good sized sales of billets have been made this week to independent steel interests.

Pig Iron Buying

The pig iron situation in the Pittsburg district has been characterized by sales amounting to about 150,000 tons, and by steadily advancing quotations. Among important purchases were 25,000 tons of Bessemer for first half to the Youngstown Sheet & Tube Co.; 10,000 tons of basic sold by the Midland Steel Co., at a price equivalent to the valley quotation of $16.70, and 9,000 tons of Bessemer for delivery in equal months for the nine months beginning October, 1909, sold by a Sharpsville, Pa., interest at $18.50, valley. Leading southern interests are asking $15, Birmingham, for No. 2 foundry, for the remainder of this year and the first quarter of next. Cleveland furnaces are adhering rigidly to $18 for No. 2 foundry for any delivery. An eastern steel company has purchased 20,000 tons of English spiegeleisen, and another steel company has contracted for 15,000 tons from Germany.

Finished Material

A considerable number of contracts for finished material will expire Oct. 1. While new contracts have been made in some cases, the Steel Corporation and the independents alike are extremely cautious in entering into obligations for delivery extending after the first of the year. On steel bars, 1.45c is now the minimum on such contracts. Mills continue to have much difficulty in making deliveries to satisfy customers. This is especially true in the case of structural material. In their eagerness to land contracts, fabricators have often made promises of completing their work within time limits desired by the builders, and are not now able to fulfill these obligations. Fabricators are bringing strong pressure to bear upon the mills to hasten deliveries.

Sheets and Tin Plate

Sheet prices have been advanced from $1 to $2 per ton, and the demand continues very heavy. An advance of 10 cents per base box on tin plate has been announced. Important transactions in line pipe include 110 miles of 12-inch and smaller pipe for a new gas line in Texas, and 30 miles of 16-inch pipe for a western gas interest, both taken by Spang, Chalfant & Co., Inc., Pittsburg. Some advances in special lines of wire products, including telegraph wire, have been made.

Coke and Old Material

The excitement which has characterized the coke market for several weeks is increasing, and higher prices are being made. Sales amounting to about 200,000 tons of furnace coke, extending over the first half of 1910, have been made at $2.85 ovens. Small sales have been made of prompt furnace coke at $3. The scrap market is strong with prices tending upward. The awarding of the old material for the Isthmus of Panama has not yet been made, and new bids may be called for.

THE WEEK IN IRON CENTERS

PITTSBURG.

Is the Pace Too Fast? Is Being Seriously Considered—Price Advances.

Office of THE IRON TRADE REVIEW,
510 Park Building, Sept. 28.

A very fast gait is now being maintained by the iron and steel industry and, in some quarters, the question whether the pace is not too swift for the ultimate soundness of conditions, is being seriously asked. A state that approaches a runaway market is ruling in some branches of the business.

From all points the industry reflects a strong pressure bearing upon it from the great head of business that has accumulated and is still piling up on mill books. Ground is steadily being lost in deliveries and the Carnegie Steel Co. is so booked ahead that it has little tonnage in shapes and plates to offer in the open market for the remainder of the present year. Because of the position of the leading steel interest in refusing to accept optional contracts for finished material for a period of more than three months ahead, this company will enter the new year with practically a clear slate as to engaged tonnage of this description, provided the present run of orders is sustained. As yet, makers have done little with business offered for next year's delivery, although in some lines, notably semi-finished steel and tin plate, there is an urgent call for action by consumers. Price changes in finished lines in the week include advances of $1 and $2 a ton on black and galvanized sheets by both the largest producer and the independent manufacturers, $2 in tin plate and an upward revision of quotations in some special grades of wire products.

The coke market presents a most agitated appearance. Some operators who, since the advancing movement had held for $3 furnace coke, have already abandoned this position for a higher level. Bona fide sales at prices close to the $3 figure have been made and the market has every evidence of strength, as spot material is scarce and many important consumers are entering into negotiations for their needs over periods of next year. Conservative coke men are joining in the bullish enthusiasm of the hour. Pig iron selling in Pittsburg territory has continued heavy and estimates place the transactions there in the past two weeks as upwards of 150,000 tons of different grades.

As an index to the present movement from mills to consumers, leading railroad systems will haul in September from Pittsburg works, a tonnage practically equal to September, 1907, which, next to October, was the heaviest month in that boom year of the industry. A survey of blast furnace operations shows 60 active stacks out of a grand total of 62 classified as belonging to the Pittsburg district.

The placing of its order for 200,360 tons of rails for 1910 delivery by the Pennsylvania Railroad Co., for the entire Pennsylvania system, adds strength to the prediction that next year's rail orders will reach one of the heaviest totals in history.

Pig Iron.—The past two weeks in pig iron buying in the immediate Pittsburg and valley territory have been the heaviest since the occasional strong movements of the market in 1907. A conservative estimate places the tonnage booked in the Pittsburg district alone at upwards of 150,000 tons. A single interest has disposed of approximately 65,000 tons in the past two weeks.

Prices have advanced steadily in the week, Bessemer now being quoted at a minimum of $18 valley, basic from $16.50 to $16.75 valley, foundry at $16.75 to $17, valley, and gray forge from $15.75 to $16 valley. For first quarter or first half, the market ranges from $18 to $18.50 on Bessemer, $16.75 to $17 on basic, $17 to $17.50 on foundry and $16 to $16.25 on gray forge. Malleable has sold at $17.25 for last quarter and at $18 for first quarter.

Heavy sales of Bessemer have been made and the available supply of this grade for this year appears to have been reduced to very moderate proportions. Basic is still moving slowly, although there is considerable inquiry pending. In the untested state of this grade, some makers are declining to quote and are awaiting developments.

The largest buyers of the week have been the Youngstown Sheet & Tube Co., which took 25,000 tons of additional Bessemer for first half from the Bessemer Pig Iron Association at $18 valley, and the Westinghouse interests which bought from 20,000 to 25,000 tons of assorted grades, mostly foundry. Of this latter purchase, the Westinghouse Airbrake took about 15,000 tons of foundry, Bessemer and gray forge, for delivery last quarter and first half, the Westinghouse Electric & Mfg. Co. about 5,000 to 10,000 tons of foundry for its Cleveland plant and the Westinghouse Machine Co. several thousand tons in addition. The foundry iron was taken at about $17 valley basis. Other sales of the week include 3,000 tons of Bessemer for last quarter at $18 valley, 1,500 tons of Bessemer for first quarter at $18 valley, 1,500 tons of basic for first half at $16.50 valley, 1,200 tons of basic for October, November and December at $16.25 valley, 750 tons of malleable for last quarter at $17.25 valley and 750 tons of malleable for first quarter at $18 valley.

A late important sale to be transacted was for 10,000 tons of basic for delivery partially over the final months of the present year and first half at $17 furnace equivalent to a valley quotation of $16.70. A local steel company is also in the market for from 3,000 to 4,000 tons of basic for first half. Large makers of southern iron have advanced their prices to $15 Birmingham for No. 2 for last and first quarter. On prompt and future shipment this year on northern iron, we quote as follows:

Bessemer, valley	$ 18.00
Bessemer, Pittsburg	18 90
No. 2 foundry, Pittsburg	17.65 to 17.90
Gray forge Pittsburg	16.65 to 16.90
Basic, valley	16 50 to 16.75
Basic, Pittsburg	17.40 to 17.65

Ferro-Alloys.—A large steel interest has just closed for from 1,500 to 2,000 tons of ferro-manganese for last quarter and first half at reported prices between $42.50 and $43 for this year and $44.50 for next. Prompt sales at higher prices to this district are reported. The market is stronger; 50 per cent silicon is commanding higher prices and the stock of low-selling material appears to have been exhausted. Domestic makers of the lower grades of ferro-silicon this week advanced their prices 50 cents and sales of 100 tons of 12 per cent at about $25.50, Pittsburg, are noted.

We quote ferro-manganese at from $43 to $43.50, Baltimore, prompt shipment, or for delivery this year and the first half of 1910, $44.50 to $45.50, Baltimore. The freight from Baltimore to Pittsburg is $1.95.

Fifty per cent ferro-silicon is quoted at $63 to $64, Pittsburg; domestic, 12 per cent, $25.50; 11 per cent, $24.50; 10 per cent, $23.50, Pittsburg. The foreign grades are held at advanced prices.

Plates.—Because of the position of the leading steel interest not to accept for a period of more than three months the optional contracts which have featured the market in the past and by reason of the deferred deliveries now ranging from two to three months, an interesting situation has developed in plates and shapes. Optional contracts now entered to cover needs for three months ahead are rendered practically void under the condition of present deliveries and few of such engagements are now being accepted. The Carnegie Steel Co. has little tonnage to offer for this year's shipment outside of the material reserved for specific contracts of regular customers. Some of the independent makers of plates are not so heavily filled with orders and on some widths can make deliveries in from three to four weeks. Specifications from car, ship building and structural operations are extremely heavy. Little is being done in riveted pipe work at the present time, but active construction activity which will involve an immense tonnage of plates is expected to follow in the approaching seasons. Definite prospects are at hand which upon their development will entail a consumption of fully 200,000 tons. Some premiums are being paid for prompt shipments in plates. Prices are very firm at the quoted schedule which is as follows:

Tank plates, ¼-inch thick, 6¼ to 100 inches, 1.50c. Extras are as follows per 100 pounds: Boiler and flange steel plate, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.20c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches, up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½-inch to and including 3/16-inch plate on thin edge, 0.10c; under 3/16 to and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—The leading maker of sheets, Tuesday, Sept. 28, announced a $2 a ton advance in both black and galvanized grades which became effective at once. The new schedule makes its prices on No. 28 gage black 2.30c and on No. 28 galvanized 3.35c. Blue annealed sheets were advanced $1 a ton a week ago, as reported. Further advances in some grades of sheets, effective Monday, Sept. 27, have been also made by some of the largest independent makers, representing the second price advance to be made by these companies in the past several weeks. Box annealed steel sheets are advanced $1 a ton, making the quotation for No. 28 gage 2.30c. The lighter gages of galvanized have also been advanced $1 and $2 a ton, making No. 28 gage 3.30c, No. 29, 3.45c, and No. 30, 3.70c. The other gages of galvanized and corrugated sheets have not been changed. The demand for sheets is very heavy and the mills are following conservative policies in selling ahead. Considerable business in corrugated iron sheets continues to be placed in this territory and the closing the past week of one contract for about 400 tons is noted. Sheet mill operations remain practically unchanged. The leading interest will start its Mercer plant of five mills at South Sharon, Pa., the next two weeks. The Youngstown Sheet & Tube Co. is now steadily operating its sheet department and has effectually broken the strike of the Amalgamated Association. Sheet prices show some range at present and we quote the market as follows:

Blue annealed sheets, Nos. 3 to 8, 1.65c; Nos. 9 to 10, 1.70c; Nos. 11 and 12, 1.75c; Nos. 13 and 14, 1.80c; Nos. 15 and 16, 1.90c; box annealed sheets, Nos. 10 to 12, 1.95c; Nos. 13 and 14, 2.00c; Nos. 15 and 16, 2.05c; Nos. 17 to 21, 2.10c; Nos. 22 to 24, 2.15c; Nos. 25 and 26, 2.20c; No. 27, 2.25c; No. 28, 2.30c; No. 29, 2.35c; No. 30, 2.45c; galvanized sheets, Nos. 13 and 14, 2.35c; Nos. 15 and 16, 2.45c to 2.50c; Nos. 17 to 21, 2.55c to 2.60c; Nos. 22 to 24, 2.70c to 2.75c; Nos. 25 and 26, 2.90c to 2.95c; No. 27, 3.10c to 3.15c; No. 28, 3.30c to 3.35c; No. 29, 3.45c to 3.50c; No. 30, 3.70c to 3.75c; painted roofing sheets, $1.55 per square for No. 28 gage, 2½-inch corrugation, and galvanized roofing sheets, $2.80 per square for No. 28 gage, 2½-inch corrugation.

Tin Plate.—An advance of 10 cents per base box or $2 a ton was put into effect Tuesday, Sept. 28, by the American Sheet & Tin Plate Co. The new price applies to current business. The time is closely approaching when prices on tin plate for next year's delivery will also be established, as deliveries on booked contracts are now running into December. Just what advance will be made cannot be anticipated. The mills of the independents as well as of the leading interest are practically sold up for this year and the former are waiting for the largest maker to take some price action before opening their books for next year's buyers. There is considerable inquiry for tin plate for 1910 delivery now before makers. Tin mill operations show little change. We quote the present market as follows, some of the independents asking advances up to 15 cents a box over the $3.50 official price:

Coke tin plate, 100-pound basis, 14 x 20, $3.50 to $3.65 f. o. b. mill, Pittsburg district. Terms 30 days, less 2 per cent for cash in 10 days.

Rails and Track Material.—The Pennsylvania Railroad Co. officially announces that it has placed orders for its rail needs for delivery in 1910 which will aggregate a total of 200,360 tons. In 1909, the road ordered 135,500 tons, and in 1908, 147,000 tons. The allotment of the order to the different mills of the respective amounts of Bessemer and open-hearth rails included has not been announced. The substantial increase in the Pennsylvania railroad's requirements over the past two years is looked upon as a very encouraging indication of the attitude of the railroads towards buying iron and steel products. Considerable buying of standard spikes by different railroads is being done. One line has just closed for a lot of 14,000 kegs, which was divided between different makers, and there have been scattering sales of 8,000 kegs. The Baltimore & Ohio railroad is also in the market for 20,000 kegs, specifying that delivery may be made at sellers' convenience. The market appears strong at 1.70c, Pittsburg, and some selling westward has been done at a higher mill price. In small spikes, some makers who had been aggressively seeking business, this week formally established their minimum at 1.70c, Pittsburg. Prospects for the rail market for next year continue to improve and it is being freely predicted that the 1910 tonnage will be one of the heaviest in history. We quote the market on Bessemer rails as follows, the base price for open-hearth rails being $30 mill:

Fifty-pound and heavier, 500-ton and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails, 8-pound, $31; 12-pound $30; 16 to 25-pound, $28; 30 to 35-pound, $28.75; 40 to 45-pound, $27; angle splice bars for standard sections, 1.50c, Pittsburg; standard spikes, 1.70c to 1.75c, Pittsburg; hand spikes, 1.75c to 1.80c, Pittsburg.

Steel.—There is considerable inquiry by consumers for semi-finished steel for next year's delivery, but a

number of the mills are declining to quote. Sheet and tin bar users are especially anxious to cover for their needs and there are increasing indications that considerable difficulty is going to be encountered by merchant buyers of sheet and tin bars in getting supplies for their requirements. A sale of several thousand tons of open-hearth sheet bars for delivery this year at $28, mill, is reported. Billets continue scarce and sales are limited to occasional transactions. One large steel maker in this district is freely offering open-hearth billets at the present time. Sales of small lots of 4 x 4 open-hearth billets have been made at $27, Pittsburg.

Bessemer 4 x 4 billets with 0.25 carbon and less are regularly quoted at $25.50 to $26, Pittsburg, with the usual extras for size and analysis, and open-hearth rolling billets from $26 to $27, Pittsburg. Forging billets are held at $29 to $30, Pittsburg. Sheet and tin bars are quoted at $27 to $28, Pittsburg.

Hoops and Bands.—Deliveries in hoops are steadily falling behind, as the tonnage being entered by the principal makers is running ahead of the current output of their mills. The cooperage trade is ordering in better volume and miscellaneous users are well supporting the market. Prices are stronger. Bands are being freely specified. We quote the market as follows:

Hoops in carload lots, 1.50c to 1.60c; in less than carload lots, 1.60c to 1.70c; bands, 1.40c to 1.50c, base with net extras as per standard steel.

Merchant Bars.—There are no signs of any slowing up in the heavy steel bar movement which has fairly overwhelmed the mills, and with some of the large interests specifications are pouring in at an increased rate, which is putting deliveries farther in arrears. Some of the independent makers have put up their maximum quotations to 1.45c and 1.50c, Pittsburg, and report some business being entered at the former price. As yet, little has been done with next year's steel bar business. Bar iron in the Pittsburg district is considerably stronger and is now held at from 1.60c to 1.65c, mill, with 1.70c for small lots. Mills adjacent to the Pittsburg district are asking 1.60c. There is a good volume of business and makers are filling up nicely, but good deliveries are still obtainable. The demand for shafting is the best in the history of present selling organizations. Plants are running double turn with several months' business booked ahead of them. The market is firm at the present discounts of 57 and 52. We quote the present market as follows:

Common iron bars, 1.60c to 1.65c, Pittsburg; Bessemer and open-hearth steel bars, 1.40c to 1.50c; plow and cultivator, 1.40c to 1.50c; channels, angles, zees, tees, under 3-inch, 1.50c to 1.55c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds, 0.15c advance; less than 1,000 pounds of a size, 0.35c advance. Cold rolled and ground shafting, 57 per cent in carloads and 52 per cent in less than carloads, delivered in base territory.

Planished and machine straightened tire is 1.60c base; iron finished tire under 1½ by 1½ inches, 1.55c, both plus ½ extra on tire card; iron finished tire, 1½ x ½ and over, 1.40c, plus net extra on the steel bar card.

On cold rolled strip steel, width 1½ inches and wider, and 0.100 inch and thicker, we quote base prices for 100 pounds, $3.05 on hard, and $3.30 on soft.

Structural Material.—From the fabricator's standpoint, the present inquiry in structural lines is rather light, which is normal for this season of the year. With the larger companies, fabricating and erecting prices have firmed up considerably and are holding steady, but there is still some cutting on the part of the small interests. The mills are working at full schedules on the heavy specifications they are receiving for work under way and the delayed deliveries upon plain material are turning the attention of builders to next year's projects, so that an earlier inquiry than usual is expected. The Riter-Conley Mfg. Co. has taken about 1,200 tons for the new additions to the plant of the McKeesport Tin Plate Co. at Port Vue, Pa., and about 750 tons for the new steel mill of the Upson Nut Co., at Cleveland. The John Eichleay Jr. Co. will furnish about 200 tons for the new St. Joseph's hospital in this city. We quote the market on structural shapes as follows:

Beams and channels, 15-inch and under, 1.50c to 1.55c; over 15 inches, 1.60c to 1.65c; zees, 1.50c to 1.55c; tees, 1.50c to 1.55c; angles, from 3 to 6 inches, 1.50c to 1.55c; over 6 inches, 1.60c to 1.65c; universal and sheared plates, 6¼ inches wide and wider, 1.50c.

Merchant Pipe.—Some large and important deals in line pipe have recently been closed. Spang, Chalfant & Co., Inc., Pittsburg, have been awarded 110 miles of 12-inch and smaller pipe for a new gas line to be laid from the Henrietta, Tex., fields to Fort Worth, Tex. The award was made by the Consumers' Light & Heating Co., of Fort Worth, and work on the line will be inaugurated within a few weeks. Spang, Chalfant & Co., Inc., have also taken 30 miles of 16-inch pipe for a western gas interest. In connection with the injunction against the state officials granted by the federal courts, effective Sept. 27, and permitting the piping of natural gas outside the state of Oklahoma, it is announced that the Kansas Natural Gas Co. will shortly begin the laying of a 60-mile, 16-inch line to Joplin, Mo. The pipe requirements for this project have been covered. Keen interest continues to be shown in the price situation on merchant pipe and advances are expected, but no announcements have yet been made. Some companies are selling cautiously pending price developments. The daily tonnage being entered is heavy and the mills are well filled for a number of weeks ahead. We quote the following official discounts on merchant pipe, subject to an additional one point and five off to jobbers:

	—Steel—		—Iron—	
	Black.	Galv.	Black.	Galv.
⅛ and ¼ inch.....	72	56	66	..
⅜ inch	73	59	67	53
½ inch	76	64	70	58
¾ to 6 inch	80	70	74	64
7 to 12 inch	75	60	69	52
PLUGGED AND REAMED.				
1 to 4 inch	78	68	72	62
EXTRA STRONG PLAIN ENDS.				
⅛ to ¾ inch	65	53	59	47
½ to 4 inch	72	60	56	54
4½ to 8 inch	68	56	62	50
DOUBLE EXTRA STRONG PLAIN ENDS.				
¼ to 8 inch.....	61	50	55	44

Boiler Tubes.—Some heavy orders in locomotive tubes are being placed by railroad interests. The Baltimore & Ohio railroad has contracted for charcoal iron tubes for 60 locomotives, including 34 consolidation engines to be built by the American Locomotive Works and 26 passenger to be built by the Baldwin Locomotive Works. Tubes on this contract will be furnished by Spang, Chalfant & Co., Inc., Pittsburg. Western railroads have placed more tube orders in the past month than they had taken in all the 12 months preceding. There is also a better demand for merchant tubes and the entire tube market, which has been slow in reviving, is more active. We quote the following official discounts on lap-welded steel boiler tubes to jobbers in carloads:

1 to 1½ inch	50
1¾ to 2¼ inch	62
2½ inch	64
2¾ to 5 inch	70
6 to 13 inch	62

2½ inch and smaller, over 18 feet, 10 per cent net extra.
2¾ inch and larger, over 22 feet, 10 per cent net extra.

To destinations east of the Mississippi river will be sold at delivered discount for carloads lowered by two points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburg.

We quote the following official discounts on charcoal iron tubes to jobbers:

1 to 1½ inch	45
1¾ to 2¼ inch	45
2½ inch	50
2¾ to 5 inch	57
6 to 13 inch	45

Wire Products.—Effective Monday, Sept. 27, some advances in the special lines of wire products, including telegraph wire, were announced by the leading interest. The standard products of wire nails, barb and plain wire have not been affected. The jobbers are beginning to specify for the fall trade but as some heavy stocks are carried the movement is not so brisk in some quarters. Some 60-day contracts at present prices are being entered. Prices are firm and we quote as follows:

Wire nails, jobbers' carload lots, $1.80; retailers' carload lots, $1.85; painted barb wire, jobbers' carload lots, $1.80; retailers' carload lots, $1.85, with 30c for galvanizing; plain wire to jobbers in carloads, $1.60, and to retailers in carloads, $1.65; polished staples, $1.80; galvanized staples, $2.10.

Wire Rods.—Prices on wire rods are purely nominal as makers are declining to sell steel and consumers are generally covered. We quote the market nominally at from $32 to $33, Pittsburg, on Bessemer and open-hearth rods. Screw rods are held at $38, Pittsburg.

Coke.—The excitement in the coke market has reached the fever state. Operators who a few days ago had fixed what then appeared very high prices on their next year's output have withdrawn these figures and have advanced them in a marked degree. To some the possibility of $3 coke no longer seems attractive and they have fixed their ideas at higher levels. There are reports that $3 has been paid for coke over a few months ahead, but these cannot be verified absolutely. There have been sales, however, of furnace coke as high as $2.90, ovens, and some heavy buying around $2.85, ovens, on contract. Sales of approximately 200,000 tons have been made, extending over the first half and all of 1910 at $2.85, ovens. There has also been some large contracting on a sliding scale over all of next year. Spot furnace coke is scarce or closely held and it is predicted that it will exceed contract in price soon. Spot sales of the week have been around a minimum of $2.75, ovens, one Mahoning valley interest having taken 10,000 tons at this figure. Up to $2.90, ovens, has also been obtained. Many consumers are attempting to get under cover at present while others are holding off in the hope of a reaction in the market. The total buying for next year has been comparatively small. Considerable contracting is being done in foundry coke at $3, ovens. One contract at $3.10, ovens, was booked this week, but $3, ovens, more closely represents the market. Spot foundry coke is selling at from $2.75 to $2.85, ovens. The labor situation is not improving and many companies, though apparently operating full, are not getting maximum production because of a lack of men. In some instances, water shortages have curtailed oven activities. On actual sales we quote furnace coke for prompt delivery at from $2.75 to $2.90, ovens, and on contract at $2.85 to $2.90, ovens, with $3 asked and reported as having been done. On first class Connellsville foundry coke we quote from $2.75 to $2.85, ovens, for prompt, and at from $3 to $3.10, ovens, on contract. The *Courier's* figures for the week ending Sept. 18 show 32,917 ovens active with an output of 426,648 tons, compared with 32,728 active ovens and a production of 424,568 tons the previous week.

Old Material.—The scrap market is sharing in a large measure the bullish sentiment that is prevailing throughout the iron and steel industry. Material is not easily obtainable, even at ruling quotations, as accumulations are being closely held for better prices. It is reported that some of the railroads are disposed to hold back their lettings. The highest open price being paid by consumers of heavy steel is $17.75, delivered, but not much trading has been done at this level, since many dealers are asking $18. Wrought scrap is in better demand at current prices, as well as cast scrap, but the latter grade is somewhat scarce. The available supply of low-phosphorus scrap is small because the largest mills are not selling. Sales have been made at $21.50, delivered. The Newark, O., re-rolling rail mill is starting and the Cumberland, Md., mill will soon resume. The Pennsylvania railroad is offering about 2,000 tons of material, of which about 800 tons are old rails. We quote gross tons delivered in the Pittsburg district, including Monessen, Sharon, Follansbee, Brackenridge and Steubenville, as follows:

Heavy melting scrap	$17.50 to 17.75
Rerolling rails	18.00 to 18.50
Bundled sheet scrap	15.50 to 16.00
Iron axles	27.00 to 28.00
Old iron rails	19.50 to 20.00
No. 1 wrought scrap	18.25 to 18.75
Old car wheels	17.50 to 18.00
Low phosphorus	21.50 to 22.00
Machine shop turnings	13.00 to 13.50
Cast borings	11.00 to 11.50
No. 1 cast scrap	16.25 to 16.75
Malleable	16.25 to 16.50
Stove plate	13.00 to 13.50

CHICAGO.

Heavy Tonnage of Rails Ordered—Pig Iron Prices Tend Upward.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, Sept. 28.

A review of the iron and steel markets has become, in the last few weeks, a stereotyped repetition of the fact that conditions grow stronger with the passing of each day. No new features are introduced, but a steady advance is recorded, and no exception worthy of note can be cited. Steel companies are not sending their salesmen out on the road, and when a customer, especially one of long standing, visits a sales office, his appearance is not hailed with joy, as it would have been a comparatively short time ago, but rather with regret, because of the knowledge that the order that he is ready to place cannot be accepted. One of the interesting features of the week has been the re-entrance of a leading southern interest into the pig iron market, after a withdrawal of some weeks. A heavy tonnage in rail orders was booked by the local company, amounting to 140,000 tons, bringing the total of that company's orders, on the present booking, very near to the half-million tons mark. In finished and semi-finished lines, business is exceedingly good, and, as mentioned in previous reports, manufacturers are refraining from selling for next year's delivery, present transactions being almost exclusively for the current year. Closely allied with the iron and steel industries, and being affected by the fluctuations occurring in them, the coke industry presents a very interesting situation at the present time. The demand for furnace coke is very heavy, as also is that for foundry coke, but the large requirements of the furnaces, coupled with a diminished output owing to labor scarcity, has brought the price of furnace coke up to a practical parity with foundry coke, and it has become the practice with coke producers to allow the Monday and Tuesday drawings of the ovens to be loaded into high frame, open cars and shipped with the other furnace cokes. In ordinary times, it is the custom to take this 72-hour coke and "cull" it for the foundry trade.

Some prices on finished steel have been moved up a few points.

Pig Iron.—The general trend of the market seems to be towards higher levels and it is a wise prophet who can foretell what the limit of the advance will be. The consumption of pig iron is increasing heavily, one indication of which is seen in the increased shipments of foundry coke, which as a rule is not stocked, but goes into consumption. Prices show some hardening, but this has not taken the form of an actual advance. One of the largest producers of foundry iron in the south has withdrawn all quotations and advanced its price to $15.00, for first quarter of 1910. This same interest reports its sales for this month, for delivery during the remainder of the year, to have been 50,000 tons. Another southern agency in this city reports sales of between 5,000 and 6,000 tons of Virginia iron in this market the past week, at least half of which was for 1909 delivery. The price was equivalent to $16.00, furnace. This would indicate that melting interests had not fully provided for their requirements in the early stages of the improvement in business, and have found it necessary to add considerably to their iron purchases made several weeks ago. The Tennessee Coal, Iron & Railroad Co. has re-entered the pig iron market, but will not consider offers of less than $15.00, Birmingham, nor for delivery later than the first quarter. The Steel Corporation expects to have its fifth furnace at Gary in blast by Oct. 15; one of its South Works stacks will go out for repairs about Oct. 1. The leading Jackson County, O., interest has advanced its prices on silvery iron, a half-dollar for each of the first two quarters of 1910. It is to be understood that the quotations on Jackson County silveries in the table below, are for this year's delivery.

We quote for Chicago delivery, as follows:

Lake Superior charcoal	$19.50 to 20.00
Northern foundry No. 1	19.00 to 19.50
Northern foundry No. 2	18.50 to 19.00
Northern foundry No. 3	18.00 to 18.50
Southern foundry No. 1	19.35 to 19.85
Southern foundry No. 2	18.85 to 19.35
Southern foundry No. 3	17.60 to 18.10
Southern foundry No. 4	17.10 to 17.60
Southern No. 1 soft	19.35 to 19.85
Southern No. 2 soft	18.85 to 19.35
Southern silveries, 4 per cent silicon	18.35 to 18.85
Southern silveries, 5 per cent silicon	18.85 to 19.35
Southern silveries, 6 per cent silicon	19.85 to 20.85
Jackson Co. silveries, 6 per cent.	20.40
Jackson Co. silveries, 8 per cent.	21.40
Jackson Co. silveries, 10 per cent.	22.40
Malleable Bessemer	17.75 to 18.25
Standard Bessemer	19.50 to 20.00
Alabama basic	18.50 to 19.00

Billets.—The same conditions rule in this market which have been reported from week to week for over a month. No billets are for sale in the Chicago territory, and hence quotations representing the market would be purely nominal and meaningless, except an outside quotation, plus freight to Chicago.

Merchant Bars.—With mill capacity well employed, there continues to be a very strong tone in the bar iron market and prices are being maintained, while, in some quarters, there are reports of a little better figure being obtained, although it must be said that this is exceptional. As mentioned last week, there is little or no selling for next year's delivery, in finished and semi-finished lines.

We quote for Chicago delivery, as follows:

Bar iron, 1.50c to 1.55c; hard steel, 1.45c to 1.50c; soft steel bars and bands, 1.58c to 1.63c, half extras, soft steel angles, less than 3 x 3, 1.63c to 1.68c, half extras; hoops, 1.63c to 1.68c base, full extras; planished or smooth finished tire steel, 1.73c to 1.78c; iron finish, up to 1½ x ½ inch, 1.63 base, tire card; iron finish, 1½ x ½-inch and larger, 1.43c to 1.48c base, steel card; channel for solid rubber tires, ¾ to 1 inch, 2.03c to 2.08c; and 1⅛ inch and larger, 1.93c to 1.98c; smooth finished machinery steel, 1.83c; flat sleigh shoe, 1.53c; toe calk steel, 2.13; spring steel, 2.18c; crucible spring steel, 2.68c; tool steel, 7c to 9c, with higher prices for special grades. Quotations on shafting are 60 per cent off the list for carload lots, and 55 per cent off for less than carload lots, carload freight allowed to points in base territory. On iron and steel bars from local stocks, we quote as follows: Bar iron, 1.80c, base, full extras; soft steel bars, 1.80c to 1.90c per 100 pounds base, plus full extras; soft steel hoops, 2.30c, full extras.

Structural Material.—The amount of tonnage being booked continues to outstrip producing capacity by a long distance, while specifications are being received for a very large amount of material, especially from railroads, for bridge work. Locally, there is something of a lull in building projects being closed. The Commonwealth Electric building, 2,500 tons, is still an unsettled matter, while the Van Alden building, to be occupied by Carson, Pirie, Scott & Co., which was to have required 5,500 tons of steel, has been changed to reinforced concrete, with a consequent reduction in the amount of steel required. The Liquid Carbon Co.'s warehouse, 300 tons, will be let in a few days. An ice rink, to be built at Marshfield avenue and the Metropolitan elevated railroad, taking 355 tons of steel, went to the Central States Bridge Co., Indianapolis, Ind. The American Bridge Co. secured the Hearst estate building, San Francisco, 2,000 tons; a building for the Union Oil Co., Los Angeles, Cal., 1,000 tons, went to the Llewellyn Iron Works, Los Angeles; the San Francisco Savings Union building, 560 tons, was secured by Dyer Bros., San Francisco; bids on the Scarborough building, Dallas, Tex., 1,450 tons, are in and the contract will be let soon; the Missouri Bridge Co., St. Louis, secured contracts for 32 highway bridges, amounting to 250 tons.

We quote mill prices for structural shapes, Chicago delivery, as follows: Beams and channels, 15-inch and under, 1.68c to 1.73c. For extras see Pittsburg report.

Local store prices are as follows: All angles, 3 inches and larger, including 6 inches, $1.90 per 100 pounds; angles over 6 inches, $2.00 per 100 pounds base; beams, 3 to 15 inches, inclusive, $1.90 per 100 pounds base; channels, 3 inches and larger, $1.90 per 100 pounds base.

Rails and Track Supplies.—Some very heavy buying of rails and track fastenings has been a feature of this week. The Illinois Steel Co. added to its rail orders for next year's delivery, 140,000 tons, of which all but 10,000 to 15,000 tons were Bessemer. This brings the total of rail orders taken by that company since the books were opened for 1910, up to a figure pretty closely approximating half a million tons. In addition to the 140,000 tons of rails, large orders for track supplies were booked. See Pittsburg report for prices on standard sections.

On light rails, Chicago delivery, we quote as follows: Light rails, 40 and 45-pound, $26.00; 30 and 35-pound, $26.75; 16, 20 and 25-pound, $27; 12-pound, $28. In lots of 250 to 500 tons a reduction of 60c a ton from these prices is made; lots of 500 tons and up carry a reduction of $1 a ton. Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; railroad spikes, 1.75c to 1.85c; smaller size spikes, 1.85c to 1.95c base; track bolts with square nuts, 2.25c to 2.35c; with hexagon nuts, 2.40c to 2.50c.

Plates.—There is a large business being handled in this market, almost exclusively for this year's delivery, as manufacturers are refraining from quoting on anything which runs beyond January 1. Prices are held firmly at previous levels. We quote, for Chicago delivery, as follows:

Tank plates, ¼-inch thick, 6¼ to 100

inches, 1.68c to 1.73c. For extras see Pittsburg report. Store quotations are without change, as follows:

Tank steel, ¼-inch and heavier up to 72 inches wide, 1.90c to 2.00c; from 72 inches wide to 96 inches wide, 2.00c to 2.10c; 3/16-inch up to and including 60 inches wide, 2.00c to 2.10c; 72 inches, 2.25c to 2.35c; No. 8 up to 60 inches wide, 2.05c to 2.15c. Flange and head quality, 25c extra.

Sheets.—About the same conditions are prevailing in this line as in others, and these conditions are similar to what have been reported in these columns for several weeks: much activity on the part of makers in trying to get out material, and much anxiety on the part of consumers over the question of delivery to them of their purchases. For mill prices see Pittsburg report. Freight to Chicago, 18 cents.

We quote store prices at Chicago as follows:

No. 10, 2.10c to 2.20c; No. 12, 2.15c to 2.25c; No. 14, 2.20c to 2.30c; No. 16, 2.30c to 2.40c; Nos. 18-20, 2.50c to 2.60c; Nos. 22-24, 2.55c to 2.65c; No. 26, 2.60c to 2.70c; No. 27, 2.65c to 2.75c; No. 28, 2.75c to 2.85c; No. 30, 3.05c; galvanized sheets, Nos. 10 to 16, 2.90c to 3c; Nos. 18 and 20, 3.05c to 3.15c; Nos. 22 to 24, 3.20c to 3.30c; No. 26, 3.40c to 3.50c; No. 27, 3.60c to 3.70c; No. 28, 3.80c to 3.90c; No. 30, 4.20c to 4.30c.

Wire Products.—A continued good business is reported from manufacturers and prices are maintained without any difficulty.

We quote, Chicago delivery, as follows: Wire nails, jobbers' carlots, $1.98; retailers' carload lots, $2.03; retailers, less than carload lots, $2.13; painted barb wire, jobbers' carload lots, $1.98; retailers, carload lots, $2.03, with 30c for galvanizing; plain wire to jobbers, carload lots, $1.78; staples, $1.98.

Merchant Pipe and Tubes.—A very satisfactory volume of business is coming in from all branches of this trade, including jobbers. Discounts are held strongly, but no advance has been announced, as yet. For mill discounts, see Pittsburg report.

We quote, out of store, as follows: Wrought steel pipe, black, ⅛-inch to ¼-inch, 69 per cent; ⅜-inch, 70 per cent; ½-inch, 73 per cent; ¾-inch to 6-inch, 77 per cent; 7-inch to 12-inch, 72 per cent. Iron pipe about 6 points higher.

Lap-welded steel tubes, 2¼-inch to 5-inch, 62 per cent to 64 per cent; charcoal iron tubes, 2¾-inch to 4-inch, 50 to 52 per cent; seamless steel tubes, 2¾-inch to 4-inch, 47½ per cent.

Cast Iron Pipe.—A very firm condition of the market is reported by makers and further advances in prices are expected in a few days. Present quotations are given by sales offices for quick acceptance only and are withdrawn if business does not result promptly. The leading interest reports a good routine business, and sales of gas pipe amounting to about 4,000 tons for the past week, with about the same tonnage of water works and culvert pipe.

We quote as follows: Four-inch water pipe, $28; 6 to 14 inches, $27; larger sizes, $26; gas pipe, $1 a ton higher.

Old Material.—The scrap market continues to present a very strong front and each day sees prices more firmly adhered to, if not actually advanced. This week, almost all lines, especially in steel scrap, are higher. Several railroad lists on scrap material are out, and will be closed this week, as follows: Great Northern, 3,300 tons; Burlington, 2,900 tons; Rock Island, 2,500 tons; Northwestern, 1,800 tons.

We quote, gross tons, as follows:

Old car wheels	$18.50 to 19.00
Old iron rails	21.00 to 21.50
Rerolling rails (4 ft. and over)	18.00 to 18.50
Old steel rails (2 ft. and under)	18.00 to 18.50
Light section relayers, 45 lbs. and under subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	23.50 to 24.50
Frogs, switches and guards	16.25 to 16.75
Heavy melting steel	16.25 to 16.75
Shoveling steel	15.75 to 16.25

We quote, net tons, as follows:

No. 1 R. R. wrought	$15.75 to 16.25
No. 2 R. R. wrought	14.50 to 15.00
Arch bars and transoms	18.00 to 18.50
Knuckles, couplers and springs	15.00 to 15.50
Shafting	16.75 to 17.25
Iron car axles	21.00 to 21.50
Steel car axles	19.75 to 20.25
Locomotive tires	17.00 to 17.50
Dealers' forge	13.00 to 13.50
Pipes and flues	11.75 to 12.25
No. 1 cast, 150 lbs. and less	15.25 to 15.75
No. 1 busheling	12.75 to 13.25
No. 2 busheling	9.25 to 9.75
No. 1 boiler cut	11.50 to 12.00
Boiler punchings	14.25 to 14.75
Cast and mixed borings	7.50 to 8.00
Machine shop turnings	10.25 to 10.75
Railroad malleable	15.25 to 15.75
Agricultural malleable	13.25 to 13.75
Stove plate and light cast scrap	13.00 to 13.50
Angle bars, splices, etc. (iron)	18.00 to 18.50

CLEVELAND.

Local Furnaces Firm in Prices—Shortage of Ore Cars.

Office of THE IRON TRADE REVIEW, Browning Building, Sept. 28.

Iron Ore.—The present daily movement from upper lake ports is heavier than it was last month, but as September has one day less than August, and as time was lost owing to Labor Day, the movement this month may not exceed that of last month, which was 7,193,199 tons. Complaints of car shortage are already being heard, but the supply is better this week than it was last. In the ore market, the clearing up of odds and ends continues.

On base ore with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.50; Mesabi Bessemer, $4.00; old range non-Bessemer, $3.70; Mesabi non-Bessemer, $3.50.

Pig Iron.—For No. 2 foundry, Cleveland furnaces are now holding firmly to $18 at the furnace for any delivery this year or next. Offers from consumers netting a few cents less than $18 are being refused. In the valley, the ordinary quotation for prompt iron is $17.50, although there has been shading in some cases. Inquiry is heavy and sales have been numerous. Prices of Jackson County silveries have been advanced 50 cents per ton, and are now quoted as follows, delivered in Cleveland: 6 per cent silicon, $19.55; 8 per cent silicon, $20.55; 10 per cent silicon, $21.55; with 50 cents additional per ton for first quarter, and an advance of 50 cents more for second quarter over first quarter.

We quote, delivered in Cleveland for this year, as follows:

No. 1 foundry	$ 18.75
No. 2 foundry	18.25
No. 3 foundry	17.75
No. 2 southern	17.85
Gray forge	16.15 to 16.40
Bessemer	18.90
Lake Superior charcoal	19.50 to 20.00
Jackson Co. 8 per cent silvery	20.55

Coke.—The strength of the coke market is well maintained, and the prospect is that still higher prices will prevail. Connellsville furnace coke we quote at $2.75 to $2.85 for prompt, and $2.85 to $3.00 for first half of next year. Connellsville foundry coke we quote at $2.75 to $2.85 for prompt, and $3 to $3.25 on contract.

Finished Material.—The demand for all kinds of finished material continues active, and mills are still having great difficulty in making deliveries to satisfy customers. The contract for 1,700 tons of plates and shapes for the construction of ore handling machinery at the docks of the Union Dock Co., Ashtabula, has been awarded the Jones & Laughlin Steel Co. The Upson Nut Co. has awarded the contract for the erection of the buildings for its new steel plant to the Riter-Conley Mfg. Co., Pittsburg. About 750 tons of steel will be required. The open-hearth construction will be by S. R. Smythe & Co., Pittsburg. There will be two open-hearth furnaces, and it is expected that the plant will be ready for operation Nov. 1, 1910. The present plans do

not include the erection of a bar mill, as it is intended to have the billets rolled into bars by the Union Rolling Mill Co. The Wheeling & Lake Erie railroad has placed an order with the leading interest for 500 tons of rails. The principal buying of bar iron, which shows some improvement, is by the railroads.

Old Material.—There is a tendency towards a brisk buying movement in the local scrap market, which is probably due to the feeling that prices have not reached the limit as yet. There is a strong inquiry for cast scrap on the part of local foundries and those in surrounding towns. Within the past week, the Lake Shore Railway Co. closed out a list of about 1,500 tons, for which some stiff prices were paid, No. 1 railroad wrought going as high as $17 and heavy steel at $18. The market holds strong, and we quote advances in a number of grades. Our quotations per gross ton, f. o. b. Cleveland, are as follows:

Old iron rails	$20.50 to 21.00
Old steel rails (rerolling)	17.50 to 21.00
Old steel rails (under 6 feet)	16.50 to 17.00
Old car wheels	17.50 to 18.00
Old steel boiler plate	14.50 to 15.00
Malleable iron (railroad)	16.00 to 16.50
Steel axles	19.50 to 20.00
Malleable iron (agricultural)	14.50 to 15.00
Heavy steel	17.50 to 18.00
Country mixed steel	14.50 to 15.00

We quote, net tons, as follows:

No. 1 R. R. wrought	$16.00 to 16.50
No. 1 busheling	14.00 to 14.50
No. 1 machine cast	15.00 to 15.50
Iron axles	20.50 to 21.50
Axle turnings	11.50 to 12.00
Machine shop turnings	11.00 to 11.50
Grate bars	12.00 to 12.50
Pipes and flues	12.50 to 13.00
Tank iron	12.00 to 12.50
Hoop and band iron	10.00 to 10.50
Sheet iron	8.50 to 9.00
Wrought drilling	10.00 to 10.50
Stove plate	12.00 to 12.50
Cast borings	9.50 to 10.00

NEW YORK.

Ocean Freights Advancing—Purchases of Foreign Spiegel.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St., Sept. 28.

Iron Ore.—The feature of the current market is the steady advance of ocean freights. Recent charters from Mediterranean points have been at 9 shillings and over and vessels are scarce. This is evidenced by the action of the leading Swedish shipper in sending over a cargo of ore in the Vollrath Tham, an 8,000-ton vessel intended only for handling ore to the German plants down the Rhine and equipped electrically for self-unloading to barges. Its hopper construction forced the taking on of a cargo of coal for return freight; the shipment of American coal to Sweden is extremely rare. Several interests having foreign ore to sell are holding it in anticipation of further advances. The 100,000 tons of foreign ore reported sold in this column last week was handled by B. Nicoll & Co., lately appointed American representative for Wm. H. Müeller & Co., The Hague.

Pig Iron.—A rush of large consumers to cover their probable requirements for the first half has resulted during the past week in the most active market since the depression began, the buying movement at times assuming an almost feverish tone leading to the fear of unhealthy developments. There is no doubt, however, that the buying is for consumption, and the danger of a runaway market is accordingly much less than if the speculative feature was evident. Sales of the week have included a number of blocks of foundry and pipe irons ranging from 7,000 to 15,000 tons each, all for eastern shipment, chiefly during the first half. There has also been an unusually heavy run of smaller orders, many consumers closing for lots of 3,000 tons or smaller, and the aggregate business of the week reached an enormous tonnage on which no accurate estimate is possible. Developments of Monday and Tuesday indicated that the movement was by no means over, as some heavy business developed in the New England district and fair activity was noted in other centers. The buying was by practically all classes of melters, the largest orders being placed by stove works, pipe foundries, machine tool manufacturing interests, electrical equipment works and locomotive shops. Steel plants took practically nothing. Prices naturally responded to the demand, Buffalo irons establishing themselves at $16.50, furnace, for the last half and $17.00 for the first, Virginia producers setting a minimum of $16.00 for any delivery, with one interest unwilling to sell beyond the first quarter, and eastern Pennsylvania furnaces reaching a materially higher level. On No. 2 southern foundry one interest has sold within a day or two on the basis of $14.50 for first quarter, but this is apparently the lowest figure. Stocks in the south are now estimated at 175,000 tons, accumulations in the Virginia district are about the same figure and eastern Pennsylvania and New Jersey furnaces probably have in the neighborhood of 75,000 tons, of which slightly under 45,000 tons is on yards of Eastern Pig Iron Association members. Orders on the latter's books during the past month showed a gain of over 75,000 tons and are now well in excess of 500,000 tons. One of the Low Moor furnaces, recently put out for relining, is about ready to resume operations. We quote, delivery at New York tidewater over the remainder of the year, as follows:

Northern foundry No. 1	$18.75 to 19.25
No. 2X foundry	18.25 to 18.75
No. 2 plain	17.75 to 18.25
No. 2 southern foundry	18.00 to 18.50
Malleable	18.00 to 18.50
Gray forge	17.25 to 17.75

Ferro-Alloys.—Two eastern steel works have made large purchases of foreign spiegeleisen, partly for prompt and partly for remote delivery. One has taken 20,000 tons of Middlesboro product and the other 15,000 tons of German spiegel. The price is not announced. The Lackawanna Steel Co. has bought 2,000 tons of ferro-manganese for March-June delivery at a price understood to be $42.50, seaboard. The Bethlehem Steel purchase of ferro-silicon, 1,200 tons, is reported on good authority to have been made at slightly under $61, delivered. Other ferro-manganese business has gone at about the $44, seaboard, basis commonly quoted.

Finished Materials.—Very little new business is developing in the structural steel line, as efforts are being centered on getting out work already contracted for and current business being principally confined to piecing out orders. One of the important factors in the trade is quoting prices only on receipt of specifications, while others are able to offer only such remote deliveries that they are practically out of the market. A railroad interest which recently put out inquiries covering its requirements of structural shapes for next year is understood to have received bids as low as 1.60c, Pittsburg, for delivery over the entire period, although in some instances the tender was 1.70c for the last half. A third loft building for the Trinity Corporation is in prospect; for the second, the steel contract for which was awarded to Levering & Garrigues some time ago, 600 tons of Bethlehem sections will be supplied. The Gould Coupler Co. has placed the order for a 400-ton crane runway at Depew, N. Y., with the Riter-Conley Mfg. Co.; the Indiana Bridge Co. will supply about 300 tons for the Atlantic Coast Line shops, and a few smaller orders have been placed. The Goeller Iron Works is low bidder on a 600-ton school building. The Reading, Long Island and New Haven are all in the market for small railway bridges and a rush job apartment house on Riverside drive will require 270 tons. While the fabricated steel situation shows marked improvement as regards prices, there are still some weak spots. Practically all the 15,000 tons of steel for the Gim-

bel building has been rolled by the Bethlehem Steel Co. and shipped to the Milliken plant for fabricating; indications are that some erection records will be established in connection with the erection of this building.

Considerable rail inquiry is pending. A Detroit road is in the market for 4,300 tons of high T rails which will be used as girders. Sales of 300 tons of forging blooms and 200 tons of billets are announced, the latter on the basis of $28.00, eastern mill. For prompt delivery, however, heavy premiums are being freely paid. Bar iron is more firm, and mills which can roll all sizes are now on a 1.50c basis for refined product. We quote:

Angles, 3 to 6 inches x ¼-inch and heavier, 1.61c; beams, 3 to 15 inches, 1.61c; tees, 3 x ¼-inch and heavier, 1.61c; plates, carloads, tank, 1.61c; marine boiler, 1.86c; bar iron, 1.60c; soft steel bars, 1.56c; sheets, No. 28, black, 2.56c.

Cast Iron Pipe.—A fair volume of current business is coming out, largely in the form of piecing out orders, although there is some inquiry for next year's delivery. Buying seems more active in the West and South than in New England and the New York district, where prices are still ragged. The recent New York City contractors' letting was divided, 1,400 tons going to the leading interest and 1,800 tons to R. D. Wood & Co. An extension to the Brooklyn waterworks system will soon be advertised for, both cast iron and riveted steel pipe being considered; if the latter is decided upon about 8,000 tons of plates will be required.

Old Materials.—A small cargo of scrap is under way to this port from the West Indies and there are reports of considerable engagements abroad for importations. No important transactions are noted in this territory, though a better demand is noted for cast scrap and turnings. Eastern Pennsylvania mills continue to buy heavily and have secured some of the accumulations held over several months for the $18.00 level to be reached. We quote, gross tons, New York delivery, the prices being those which dealers are willing to pay:

Old steel rails (rerolling)	$15.00 to 15.50
Relaying rails	19.00 to 19.50
Old car wheels	14.50 to 15.00
Old iron car axles	22.00 to 23.00
Old steel car axles	20.00 to 20.50
Heavy melting steel	15.00 to 15.50
No. 1 railroad wrought	17.00 to 17.50
Iron track scrap	15.00 to 15.50
Wrought pipe	14.00 to 14.50
Cast borings	9.50 to 10.00
Wrought turnings	11.50 to 12.00
Heavy cast scrap	13.00 to 13.50
Railroad malleable	13.00 to 13.50
Stove plate	11.50 to 12.00
Grate bars	11.00 to 11.50

CINCINNATI.

High Pig Iron Prices Not Tested—Large Stocks of Foundry Grades On Hand.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., Sept. 28.

Pig Iron.—The advancing tendency in pig iron prices in this market continues with furnaces withdrawing from the market and raising their asking figures. During the week the quotation for prompt shipment iron and for the remainder of the year of $14, Birmingham, has disappeared, and $14.50 appears to be the minimum for southern iron, and this is offered only in a limited way. Inquiry for prompt shipment is, however, moderate, although it is understood that the leading interest in cast iron pipe is negotiating for a considerable tonnage for reasonably prompt shipment and has made some purchases on the basis of $14.50, Birmingham. At the close of the week, one of the largest producers in the Birmingham district has advanced to a $15 basis for the remainder of this year and the first quarter of next year. Several large producers in the south have withdrawn from the market and are not quoting for any delivery. In southern Ohio, one furnace interest is demanding $17 at furnace for the remainder of this year and first half of next. Three large producers have withdrawn all quotations for any delivery. One of these interests, however, took considerable tonnage in the St. Louis territory during the week on the basis of $16 for No. 2 at furnace, and also some malleable at the same price for delivery over the remainder of the year. One of the makers of high silicon irons in southern Ohio has advanced to a basis of $19, furnace, for this year, $20 for first quarter, $20.50 for second quarter for 8 per cent. A fairly good tonnage of inquiry is pending. An inquiry from Chicago territory for 5,000 tons of basic is under consideration. Another melter is inquiring for 3,000 tons of basic. An Ohio melter is inquiring for 2,000 tons of foundry for next year's delivery, part northern and part southern iron. A Michigan melter is in the market for 550 tons of malleable Bessemer and 500 tons of foundry for fourth quarter delivery. Another consumer wants 750 tons of 4 per cent to 5 per cent silicon, and there are a number of smaller tonnages pending. Southern charcoal iron has advanced to $22, Birmingham.

At the advanced prices, melters are less eager to purchase and show some hesitancy, but the situation has not yet been tested, as the higher quotations have been too recently made to furnish opportunity of judging how they will be received by the buyers. The sentiment here is growing that foundry iron is perhaps unduly influenced by the steel making iron market. It is being freely exploited that visible stocks of pig iron amount to about 1,000,000 tons, mostly foundry grades, and that a large number of consumers have covered for the remainder of the year and first quarter of 1910. In the trade, the question as to whether top prices have been reached on this advance is under discussion. A reaction is not anticipated, but the attitude of buyers of foundry iron toward the market at the advances asked is a matter of interest.

The furnaces in withdrawing from the market are apparently not entirely influenced by speculative reasons. Past experience has demonstrated the inability to deliver high priced contract iron on a low priced spot market. Furnace costs are also seriously considered, due to the advance in coke and the probable advance in labor. Some producers openly declare themselves unfavorable to a policy of long forward commitments, and this is particularly noticeable in the south. We quote for prompt shipment and for the remainder of the year, delivered Cincinnati, based on freight rates of $3.25 from Birmingham, and $1.20 from Ironton, as follows:

Southern foundry No. 1	$18.25 to 18.75
Southern foundry No. 2	17.75 to 18.25
Southern foundry No. 3	17.25 to 17.75
Southern foundry No. 4	16.75 to 17.25
Southern No. 1 soft	18.25 to 18.75
Southern No. 2 soft	17.75 to 18.25
Southern gray forge	16.25 to 16.75
Northern No. 1 foundry	17.70 to 18.70
Northern No. 2 foundry	17.20 to 18.20
Northern No. 3 foundry	16.70 to 17.70
Jackson county 6 per cent silicon	18.70 to 19.20
Jackson county 8 per cent silicon	19.70 to 20.20
Jackson county 10 per cent silicon	20.70 to 21.20

Finished Material.—The specifications continue liberal on contracts and the market is firm. Mill deliveries are gradually getting a little farther behind. Steel bars are quoted at 1.45c to 1.50c, Pittsburg, in carload lots, for reasonably nearby shipment. The market for next year has not been opened in this territory. A railroad interest has bought 14,000 kegs of spikes for first half delivery during the past week. The price paid was an advance over present quotations for this year's delivery.

Coke.—The market continues strong with ovens steadily advancing prices and declining to contract beyond the first half of next year. Foundry coke is moving freely and the calls for coke on foundry contracts are steadily increasing. Prices in the leading coke producing districts are as follows:

Connellsville district:	Prompt shipment.	Remainder of year.	First half 1910.
Fdy. coke.	$2.50 to 2.75	$2.50 to 2.75	$2.75 to 3.25
Fur. coke.	2.25 to 2.40	2.25 to 2.50	2.65 to 3.00
Wise county district:			
Fdy. coke.	2.75	2.75	3.00
Fur. coke.	2.15 to 2.25	2.15 to 2.25	2.25 to 2.35
Pocahontas district:			
Fdy. coke.	2.50	2.50	2.75
Fur. coke.	2.25	2.25	2.50

Old Material.—There is considerable interest in the market and holders are advancing their views. Dealers are in the market to cover short sales. It is becoming increasingly difficult to buy scrap at prices that will yield a profit on a quick turn over of the material, but there is strong competition among the buyers of scrap and buying prices are advancing accordingly. Dealers' prices here are represented by the following quotations. These prices include breaking and preparation for the melter including dealers' profit:

Old No. 1 R. R. wrought, net tons	$14.50 to 15.00
No. 1 machinery, net tons	14.50 to 15.00
No. 1 busheling, net tons	14.00 to 14.50
Old iron rails, gross tons	15.00 to 16.00
Old steel rails (re-rolling) gross tons	14 50 to 15.00
Old short lengths, gross tons	14.00 to 14.50
Old iron axles net tons	17.00 to 17.50
Heavy melting scrap, gross tons	15.00 to 15.50
Stove plate, net tons	10.50 to 11.00
Heavy turnings, net	9.50 to 10.00
Cast borings, net tons	8.00 to 8.50
Car wheels	15.50 to 16.00

PHILADELPHIA.

Melters Are Hesitating and Furnaces Are Well Supplied with Orders.

Sept. 28.

Pig Iron.—The market has experienced a distinct slowing-up during the past week, and the volume of business placed has been smaller than for some time past. Plenty of inquiry is still current, but, as a rule, melters are inclined to hesitate before closing for further tonnages at the high level to which the market has been driven by recent activities, and furnaces have taken on sufficiently large orders of the back-log type to give them an independent feeling. Since the business taken a fortnight ago, when a number of producers sold on the $18 basis, there has been no movement of basic, although considerable inquiry has been circulated with the hope of securing further iron at this level. Basic deliveries are much improved, and some spot metal may be available shortly. The asking price is from $19 to $20, delivered, depending on the maker and the shipment sought. Low phosphorus is higher, a leading maker having advanced to the equivalent of $22.50, eastern Pennsylvania delivery. Inquiries have increased and a sale of Cornwall product is noted at $18, furnace. Foundry is well established on a minimum of $18.35, early delivery in this territory, with first half iron from $1 to $1.50 higher. Pipe-melting irons continue scarce and are higher. There is every reason to believe that reports of a cargo of British iron being shipped to this port are without foundation, although the market is close to the importation point. In some cases American houses holding Middlesboro warrants have sold, preferring to take their profits to running the risks incident to importing the iron. We quote, delivery at eastern Pennsylvania plants over the remainder of the year:

No. 1X foundry	$18.75 to 19.25
No. 2X foundry	18.25 to 18.75
No. 2 plain	17.75 to 18.25
Standard gray forge	16.75 to 17.25
Basic	18.50 to 19.00
Low phosprorus	21.50 to 22.50
No. 2 Birmingham	18.00 to 18.50
No. 2X Virginia	18.50 to 19.00
No. 2 plain Virginia	17.50 to 18.00

Finished Materials.—The structural market is extremely quiet, only a few scattered propositions being under consideration. The leading interest is understood to have taken the structural section order of the Norfolk & Western for the 3,000 cars to be built at Roanoke, some 16,500 tons, while the plate requirements, about twice this tonnage, is reported to have been taken by the Central Iron & Steel Co.; deliveries extend over next year. One interest, which is sold up on certain sizes of steel bars for several months, is willing to book such sizes as are still available, principally heavy material, on a 1.40c, Pittsburg, basis. We quote: Shapes and plates, 1.65c; steel bars, 1.55c to 1.60c; iron bars, 1.55c to 1.60c; plates No. 28, 2.80c.

Old Material.—Although the associated mills are offering only $18, delivered, for heavy melting steel scrap, and odd lots are being picked up at that figure, an interest outside this organization has purchased several blocks of 1,000 tons each at $18.50, and certain dealers are asking $19 for attractive tonnages. There is a growing belief that the Panama canal accumulations may be re-advertised, as the Isthmian commission has received a number of protests against the award of this material after the elimination of the higher bids. In case re-advertisement is decided upon, the deposit required with each bid will doubtless be considerably increased, as the present system permits of widespread abuse. We quote, gross tons, delivery at eastern Pennsylvania plants, as follows:

Old steel rails (rerolling)	$18.75 to 19.25
No. 1 steel scrap	18.25 to 18.50
Old steel axles	23.00 to 24.00
Old iron axles	26.00 to 27.00
Old iron rails	20.00 to 21.00
Old car wheels	17 00 to 17.50
Choice scrap R. R. No. 1 wrought.	20.00 to 20.50
No. 1 yard scrap	18.50 to 19.00
Machinery scrap	16.00 to 16.50
Low phosphorus scrap	21.50 to 22.00
Wrought iron pipe	17.00 to 17.50
No. 1 forge fire scrap	16.00 to 16.50
No. 2 forge fire scrap, ordinary.	9.50 to 10.00
Wrought turnings	14.50 to 15.00
Axle turnings, heavy	16.25 to 16.75
Cast borings	12.50 to 13.00
Stove plate	14.00 to 14.50

BUFFALO.

Large Tonnage of Pig Iron Sold to Many Consumers.

Office of THE IRON TRADE REVIEW,
932 Ellicott Square, Sept. 28.

Pig Iron.—More iron was sold during the past week than in any like period during the year. Inquiries were numerous and many consumers appeared in the market for heavy tonnage. There were more bookings of tonnage ranging from 2,000 to 4,000 tons than usual. It is estimated that the closings of the week aggregated between 40,000 and 50,000 tons. The amount of business taken by the foundries here during the preceding several months was unsatisfactory. Business was dull. Recently the tone changed at the foundries and most of them report improved conditions.

Furnaces had been finding a much stronger market for their output at other points than Buffalo, some of which were far distant. The closing of September, however, shows a better business balance and prospects are not discouraging for the foundry interests.

The furnace outlook is satisfactory and prices on forward delivery orders are stiffening. As a general thing forward iron will bring easily $1 more than prompt prices. Prices quoted below seem to best hit the prevailing conditions, but it should be borne in mind that certain interests quote a much higher figure on some grades and are now holding out for the advanced prices. One furnace interest is asking $17.50 for No. 2 plain and No. 2X is held at $18, deliveries during remainder of the year. The same interest asks $18 for malleable Bessemer. Transactions are taking place at these prices. The general pig market conditions are tightening and it is necessary to revise quotations and an advance will be observed in some instances. Gray forge cannot be bought at $15.25. The price is now $16.00 to $16.50. Charcoal is held for $20.00 to $21.00. The range is shortening up, bringing the high and low prices closer together. We quote f. o. b. Buffalo for deliveries during balance of 1909, as follows:

No. 1X foundry	$17.00 to 17.50
No. 2X foundry	16.25 to 17.00
No. 2 plain	16.00 to 16.50
No. 3 foundry	16.00 to 16.50
Basic	16 50 to 17.00
Gray forge	16.00 to 16.50
Malleable Bessemer	18 00 to 18.50
Charcoal	20.00 to 21.00

Finished Products.—Current and

contract business occupies most of the attention of mill interests, the number of new projects being small. One leading foundry interest is likely soon to erect a 200 x 400 foundry and the Pierce-Arrow Motor Car Co. contemplates doubling capacity within six months to build commercial vehicles. The Lackawanna Steel Co. is running day and night turns. Most mill interests are about 60 or 90 days behind on bar deliveries, while structural deliveries run from six to eight weeks.

ST. LOUIS.

Much Interest Shown at St. Louis Over First Quarter Requirements.

Sept. 27.

Pig Iron.—Considerable interest is manifested in the St. Louis territory by foundrymen as to requirements of pig iron and coke for shipment over the first quarter of next year. Inquiries are coming in satisfactorily from most of the foundries, and there is very little, if any No. 2 iron to be had at $14, Birmingham basis. The bottom price is believed to be $14.50. Another large furnace interest has withdrawn from the market, and prices, if they have changed at all, are stronger. One buyer asserted last week that he could purchase Southern No. 2 at $14 for shipment up to Jan. 1, but this price is believed to be out of the question now. It is not an exaggeration to say that the market is firm at $14.50, Birmingham, and in some instances $15 is reported to have been obtained for prompt delivery. For first quarter shipment, from $14.50 to $15 is asked. Ohio strong foundry iron is held at $17.50 to $18, furnaces, for No. 2.

Malleable Bessemer is scarce. One inquiry is pending for 1,500 tons for shipment beginning Oct. 1 and extending over the first quarter of 1910. One sale of 200 tons of Ohio No. 2 foundry was made today in the St. Louis territory at $17.50, furnace basis, for October shipment. An inquiry is out for a large tonnage of basic for delivery before Jan. 1, but the buyer is finding it hard to place, as most furnaces have sold up to the end of the present year. Another inquiry is out in the St. Louis territory for 1,000 tons of stove iron, high silicon. Our prices, delivered, to which the Birmingham freight of $3.75 has been added, follow:

No. 1 southern	$ 18.75
No. 2 southern	18.25
No. 3 southern	17.75
No. 4 southern	17.25

Coke.—The prices of coke, both foundry and furnace grades quoted last week from the St. Louis territory, have been withdrawn, and there seems to be a tendency to an advancement all along the line because of the scarcity of labor at the ovens and the great demand for furnace coke. The best-selected Connellsville foundry coke, 72-hour grade, is quoted today at $2.75 to $3 for prompt acceptance and early delivery. For delivery over the first quarter of 1910, the best price on this grade is $3, f. o. b. ovens in each instance. The best Connellsville 48-hour furnace coke is offered at $2.50 to $2.75, ovens, for prompt shipment, and $2.75 to $3 for first half delivery. The market is unsettled, with a tendency toward higher figures. Virginia 72-hour foundry coke is quoted at $2.50, ovens, for delivery over the remainder of the year, and at $2.75 for first half shipment. One sale of 25 cars was made today at $2.50, ovens, for delivery prior to Jan. 1.

Old Material.—Quotations on scrap iron remain as follows:

Cast iron borings, free from foreign material, net tons	$ 5.50 to 6.25
Steel axle turnings, gross tons	11.00 to 12.00
Steel railroad axles, net tons	18.00 to 19.00
Iron railroad axles, net tons	20.00 to 21.00
Miscellaneous steel scrap, gross tons	11.00 to 12.00
Old car wheels, gross tons	15.50 to 16.50
No. 1 railroad cast scrap, net tons	12.50 to 13.50
Heavy machinery cast, net tons	14.00 to 14.25
Stove plate and light cast, net tons	10.00 to 11.00
Sheet iron, net tons, uncut	5.00 to 5.50
No. 1 railroad wrought, net tons	13.00 to 13.50
Railroad malleable net tons	13.00 to 13.50
Heavy melting steel, net tons	12.00 to 13.00
Relaying rails, net tons	18.00 to 19.00
Extra heavy cast, regular breaking	12.00 to 13.00
Railroad grate bars (eng)	10.50 to 11.00

BIRMINGHAM, ALA.

No Great Amount of Stock Remains on Hand.

Sept. 29.

Southern pig iron manufacturers are holding their product firmly on a $14.50 minimum basis, asking $15 per ton, No. 2 foundry, for first half of the coming year, and recording some sales at one or the other price. There is not a very great amount of iron to be had in this territory for the balance of the year, regular customers though being protected on their needs. Selling agents throughout the country have been notified of the advancing market and much hesitation is noticed among the producers in booking business. While the reports of the iron sold for next year's delivery do not show up any big amount in the aggregate, several sales are known of, one in particular being for one thousand tons, delivery during the first half of the coming year. Quite a bit of the iron that belongs to consumers, brokers and speculators on the yards in this district is beginning to move out now, and the shipments and home consumption combined are greater than the make.

Production is showing some improvement. With six out of seven furnaces in operation the Sloss-Shefield Steel & Iron Co. is getting out more than 35,000 tons of iron per month. No less than five blast iron furnaces are scheduled to go into blast next month, probably seven will receive the torch.

The steel plant of the Tennessee Coal, Iron & Railroad Co. is adding to its labor forces and increasing the output right along.

Cast iron pipe plants are working on full time and shipping the product as rapidly as it is being manufactured.

Brass foundrymen in the Birmingham district are busy folks. The resumption of operations at furnaces is calling for a general line of tuyeres, coolers and other appurtenances for the iron-makers. There is steady work for the foundrymen handling this kind of work for some time to come.

Old iron material quotations follow:

Old iron rails	$16.00 to 16.50
Old iron axles	17.50 to 18.00
Old steel axles	16.50 to 17.00
Old steel rails	11.50 to 12.00
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	11.50 to 12.00
No. 1 country	8.00 to 8.50
Old standard car wheels	13.00 to 13.50
Stove plate	9.00 to 9.50
Heavy melting steel	13.00 to 13.50
Old steel boiler plate	8.50 to 9.00
No. 1 machinery	11.50 to 12.00
Cast borings	5.50 to 6.00

BRITISH IRON MARKET.

Some Inquiries for Pir Iron From America, But No Sales.

Office of THE IRON TRADE REVIEW, Prince's Chambers, Corporation St., Birmingham, England, Sept. 18.

Pig Iron—The week has been comparatively quiet in the pig iron department without change in price. Much interest has been taken in Cleveland in American operations owing to the belief that trans-Atlantic orders would shortly be forthcoming, in view of the similarity of prices, but, so far, inquiries, though fairly numerous, have led to nothing practical. The only transaction recorded is a shipment of 3,000 tons of scrap steel to the states. The American influence has been partly discounted by the action of speculators hastening to realize profits. But yesterday's business was buoyant on the basis of 51s 4d ($12.56) cash with 52s ($12.00) for three months delivery. There is a strong belief that a decrease in stocks is pending. At present they stand at 303,000 after a continuous increase of 15 months. The tendency of shipments generally is decidedly upwards. The improvement in hematite is maintained with

an upward tendency, mixed numbers being quoted at 59s ($14.44) with 62s 6d ($15.30) for forward delivery. Makers' prices have advanced about 4s from the minimum of the year. In the Midland district the position is substantially unchanged. There is very little buying simply because consumers have satisfied their wants. But smelters are very well off for orders, and it is believed a further buying movement is pending. The firmness of the coke market, which has just experienced a rise of 1s 3d per ton, has considerably strengthened the hands of the makers of pig iron.

Finished Material.—Although the iron and steel trades are better, they fail to reflect the buoyancy of America. An expression frequently used on the Birmingham exchange on Thursday was that the trade is "marking time". Prices do not give way, mainly because, generally speaking, orders are not immediately urgent, but, in certain directions, there is a great outcry for specifications, which are not coming along at all well. In some cases, manufacturers are putting their output into stock, in the hope that it will be called for soon. Naturally, buyers make the most of this to argue that the small boom of a month ago was largely artificial and speculative, and to an extent this is admitted. Yet a substantial fact is that recent bar transactions have been on the basis of an advance of 7s 6d on minimum figures. The continued dullness of demand for structural and building purposes is a marked and unsatisfactory feature. The railways are still buying poorly, and apart from the indirect influence the improvement, so far is almost restricted to shipbuilding and naval requirements. These, however, have had a far reaching effect, and makers in all branches are hoping for the best. Among the hopeful features is the growing strength of galvanized iron sheets, in which makers readily secure £11 to £11 5s per ton. There has been some very heavy buying of billets, which are now from 2s 6d to 5s dearer than they were a month ago.

GERMAN IRON MARKET.

Tone is Improving on Account of Encouraging Reports From America.

Dusseldorf, Germany, Sept. 16.—A sudden and important improvement has set in, in all parts of the iron and steel market, principally on account of the splendid American reports. Merchants and consumers are very anxious to cover their requirements at the increased prices for as far ahead as possible and for the biggest possible quantities, whilst producers are rather shy of selling. It is true, that the business for export offers better chances and profits than domestic business, but trade in Germany will soon have to follow the improvement on the export market. The prices for all products have been raised considerably and the whole market is very firm.

Prime Westphalian hematite pig iron with a guarantee of not more than 0.05 per cent phosphorus has sold in great quantities for export at 58 marks ($13.80) per 1,000 kilos f. a. s. Rotterdam. About 40,000 tons of spiegel, 20 per cent, were sold some three days ago for export to the United States at 81 marks per 1,000 kilograms f. a. s. Rotterdam ($19.25). A large business has also been done in ferro-manganese for export, 80 per cent manganese having sold at 160 marks ($38.00) per 1,000 kilograms f. a. s. Rotterdam. Evidently, the latter metal was also intended for the states. The prices for bar-iron, sheets and plates have improved by about 10 marks ($2.25) per 1,000 kilograms and there are negotiations now to syndicate the whole production of these lines.

The coal and coke market continues to remain dull but firm. No doubt, however, the improvement on the iron market will soon favorably influence the fuel markets.

There is no fear of a setback anywhere but on the contrary, everybody is full of confidence and expects further improvement both on account of the American situation and because the markets in France, Belgium and Austria are improving. The political situation and the money market are also favorable.

METAL MARKETS.

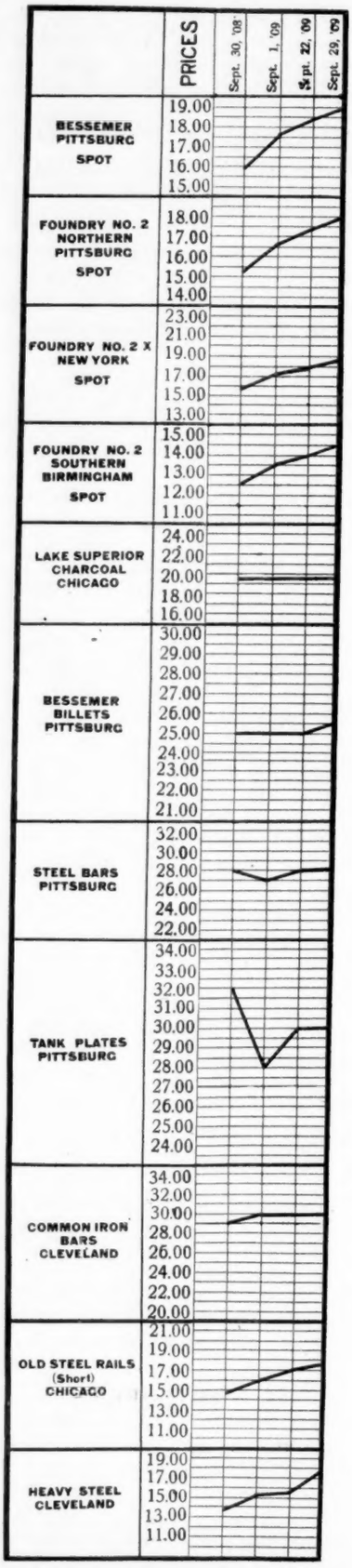
ST. LOUIS.

Sept. 27.

Lead and Zinc.—A high price of $52 a ton was paid for zinc blende in the Missouri-Kansas-Oklahoma district last week, on an assay base of $49 for 60 per cent zinc. Not much ore was sold, for $49, however, the price ranging down to $45.

A rising market this week, as a result of the sudden advance in St. Louis spelter Saturday from $5.75 to $5.82½ a ton, is the belief of lead operators. There has been a gradual accumulation of ore in all of the camps in the dis-

PRICE CHART.



tricts as a result of the increased production, which is taken as indisputable evidence that demands of zinc smelters can be supplied within the confines of the United States. Quite a number of large tracts with ore blocked out are beginning to make themselves felt in the production, and a total output of 6,000 tons a week of zinc ore soon will be outdone.

Calamine sold last week at $25 on a 40 per cent basis, with choice lots bringing much higher prices. Offerings of lead ore were not strong last week, two of the largest buyers being out of the market. The price realized was $56 a ton. St. Louis pig lead was quoted Saturday at $4.30, an increase over the preceding week. Lead ore sold as high as $57 a ton, when running better than 80 per cent.

CHICAGO.

Sept. 28.

New Metals.—As a whole, the metal market is quite strong, although casting copper is a trifle easier and fractionally lower. Spelter is very firm and has advanced five points.

We quote as follows: Lake copper, carload lots, 13½c to 13⅝c; casting copper, 13c; smaller lots, ¼c to ¾c higher. Spelter, 5.85c to 5.90c; lead, desilverized, 4.40c to 4.45c in 50-ton lots; corroding, 25c per 100 pounds higher; sheet zinc, $7.50 list f. o. b. La Salle in car lots of 600-pound casks; pig tin, 31¾c to 32¼c; Cookson's antimony, 10½c; other grades, 9¾c to 10¼c.

Old Metals.—The old metal market is strong and scrap material is scarce. Copper appears to be particularly strong. The entire list is held firmly and electrotype dross is a quarter of a cent higher.

We quote dealers' selling prices, as follows: Copper wire, 13c; heavy copper, 12¾c; light copper, 11¼c; heavy red brass, 11¾c; heavy yellow brass, 9¼c; light brass, 6½c; No. 1 red brass borings, 9¾c; No. 1 yellow brass borings, 7½c; brass clippings, 9¼c; tea lead, 3.60c; lead scrap, 4c; zinc, 4½c; tin pipe, 29c; tin foil, 27c; pewter, 20c; electrotype plates, free from wood, 4¼c; electrotype dross, 2.75c; stereotype plates, 4½c; stereotype dross, 3.50c; prime slab zinc dross, $70 per ton.

NEW YORK.

Sept. 28.

Copper.—In spite of several unfavorable features, prominent among them the light exportation movement in the face of heavy production, the market has held its own during the week and in the aggregate has shown considerable activity. Prices are on about the same level as a week ago but the situation is somewhat more firm and improvement is expected to follow a sharp advance on the London market, which began yesterday. We quote, Lake, 13¼c to 13½c; electrolytic, 13c to 13¼c, and ordinary brands, 12⅝c to 12⅞c.

Pig Tin.—The market is higher than a week ago, reflecting the considerable activity which recently developed and the improved tonnage resulting. The foreign market continues to advance and current domestic business is on the basis of 30⅜c to 30⅝c, New York.

Pig Lead.—No important change is to be noted, the market being without feature and the price barely steady at 4.30c to 4.35c, New York delivery.

Spelter.—The British market is holding up well in spite of a decreased inquiry and current domestic quotations show little change, the range being from 5.70c to 5.85c.

Antimony.—We quote Cookson's 8⅝c to 8¾c; Hallett's and U. S. 8⅛c to 8⅜c; outside brands at 7⅝c to 8c.

TARIFF SECTIONS CONSTRUED.

New York, Sept. 28.—The treasury department of the United States has ruled on section 29 and that portion of sub-section 11 of section 28 of the tariff act of 1909 which reads: "That when the actual market value cannot be ascertained to the satisfaction of the appraising officer he may take the cost of production, add thereto not less than 10 per cent for general expenses and a further addition of not less than 8 per cent on total cost thus ascertained."

Under the Dingley law an addition of 5 per cent for general expenses was accepted by the government and the department held that merchandise appraised prior to Aug. 6th, 1909, is not subject to reappraisement at the higher valuation mentioned in sub-section 11 of new law.

Section 29, which reads that merchandise in warehouse "shall be subject to duties imposed by this act," was held to refer only to rate of duty and not the value of the goods.

The Bristol Co., Waterbury, Conn., has established a branch office in the Frick building annex, Pittsburg. The company makes recording instruments and is specializing in recording instruments for blast furnaces, including pressure gages for hot blast, top gas and steam, pyrometers, and time recorders for rotary top, skip hoist, etc.

PENNSY ORDERS,

And New York Central Expected to Do So Soon.

(Special Telegram.)

New York, N. Y., Sept. 29.—The Pennsylvania system has placed orders for next year's rail requirements aggregating 200,000 tons. The Illinois Steel Co. has booked 10,000 tons for next year as an additional order from another road and the scattered business closed by Corporation interests is close to 20,000 tons. The Lackawanna Steel Co. has sold the Northern Pacific for this year 10,000 tons, half Bessemer and half ferro-titanium. The New York Central business is reported near closing and some other important lots are pending. Honolulu has bought 1,000 tons of 70-pound rails.

Unofficially, it is understood that the Pennsylvania rail order will be divided about as follows: Pennsylvania and Cambria steel companies, 40,000 tons each; Corporation, 85,000; Lackawanna Steel Co., 20,000; Bethlehem Steel Co., 15,000 tons. The St. Paul has placed an order with the Corporation for 75,000 tons, a Mexican line has taken 12,000 tons and the Gould lines are buying heavily from time to time. The New York Central order will probably run a quarter of a million tons.

The pig iron movement continues without signs of cessation, some very attractive tonnages now being under negotiation. Basic sales of the week were only about 10,000 tons.

The Gary rail mill rolled over 40,000 tons in September.

A NEW CHUCK BUSINESS IN WINDSOR LOCKS, CONN.

S. E. Horton, whose father, S. E. Horton, and grandfather, Eli Horton, founded the chuck business in Windsor Locks, Conn., has himself now started a new plant for the exclusive manufacture of lathe chucks from 6-inch to 26-inch. This new company is the S. E. Horton Machine Co., and is incorporated under Connecticut charter. Mr. Horton has had about 20 years' active experience in the chuck business and also has associated with him in the new company several men of special experience in chuck making. O. S. Rockwell, for nearly 16 years a foreman in this line of work, has charge of the new shops as superintendent. Entirely new equipment, both standard and special, has been installed and the new shops are now running on a strictly manufacturing basis.

VIGOROUS EFFORT

TO EXTEND FOREIGN TRADE OF THIS COUNTRY.

Plans for Encouraging Use of Steel Products Abroad — Tariff Board's Important Work.

Washington, D. C, Sept. 26.—At no time in the history of the departmental organizations here, at least since the days of Mr. Blaine's temporary but aggressive efforts in the State department, has there been such manifestation of determined effort in the interests of foreign trade development as is indicated at this time in the work in progress in the state, commerce and treasury departments, notably in the former branch of the administration. It is not unexpected that reports already are coming here indicating a response from the large corporations in the country which are taking note of the work going on in Washington, and are preparing to be early in the foreign fields with efforts to secure footholds for American trade.

Attention has been called to the work in progress in the development of Chinese railway construction to open new and fertile fields in the interior of the great empire. This is but a part of the work the State department has mapped out, and which will be pushed, not only in the orient, but in every other section of the world, where American goods are in demand, or where a demand for them can be created. The most interesting feature of this work is the fact that in all lines of iron and steel production it is expected that American producers and exporters will be promptly on the ground with products calculated to meet the wishes of foreign buyers, not only as to character of commodities, but as to prices.

Tariff Problems.

The meeting here during the past few days of the new tariff advisory board, which was authorized by the tariff law passed at the special session of congress, in order that President Taft may be given prompt and correct information as to the workings of foreign tariffs, and be prepared to apply the provisions of the maximum tariff section in the new law, is a step in the direction of expansion. The board will have before it many complex questions, which cannot but affect directly and indirectly the export trade in all lines of iron and steel products, these being among the leading articles of American export.

An important feature of the maximum tariff, as affecting the export trade of the country, is the duty that will devolve upon the president of applying the penalizing rates imposed under this new section of the law in cases wherein it is shown that any foreign country "discriminates unduly" against the trade and commerce of the United States. It will be observed that the word "unduly" leaves no little discretionary latitude with the president with respect to the imposition of the penalties of the maximum tariff. But there are a number of instances, soon to be considered by the tariff board, which will bring up squarely the question whether policies pursued by foreign governments constitute discrimination against the trade of this country.

It is probable that not only will the tariff laws and regulations of Germany receive prompt and earnest attention, but a number of so-called reciprocity treaties concluded by France with Canada and other countries, with the avowed object of encouraging the exports of agricultural implement exports to France and her provinces, will require careful consideration.

The fact should be borne in mind, in connection with the determination of what constitutes "undue" discrimination against American trade by a foreign government, that under the interpretation of international law and practices by this government in the past, it has invariably been held that the granting of reciprocal concessions does not amount to such favors as entitle other nations, having "favored nation" treaties with the United States, to similar treatment. Reciprocity has been construed to be a grant of favors for favors bestowed, and not a general policy affecting all nations alike.

The various bureaus and divisions of the administration, and especially the board of tariff advisers of the president, will be confronted with many vexatious and troublesome questions, growing out of the necessity of determining what constitutes discriminations by foreign countries against the trade of the United States. Upon the correct solution of these questions, and affirmative action by the president, will depend much in the way of enforcement of the provisions of the new tariff law, and much in the way of foreign trade expansion that will be helpful to American exporters.

ARTHUR J. DODGE.

A STUDY OF THE OPEN-HEARTH.

The Harbison-Walker Refractories Co., Pittsburg, in a well-printed, leather bound volume entitled "A Study of the Open-Hearth," containing 91 pages, presents in concise form the principles involved in the manufacture of open-hearth steel. Detailed descriptions of the construction and operation of open-hearth furnaces are given in simple language that can be readily understood by one familiar with no more than the most elementary principles of chemistry and metallurgy. This study of open-hearth furnaces was originally compiled by this concern for the use of its operating department, inasmuch as it was realized that only by a full understanding of all of the conditions encountered in open-hearth practice can refractory materials be so manufactured as to maintain the highest standard for such work.

Details of the construction of both basic and acid furnaces are spread over no less than 41 pages. Practical instructions are given for building the hearths and bottoms, front and back walls, bulk heads, ports, regenerators, etc., while the various materials for the bottoms—acid, neutral and basic—are discussed at length. One entire chapter is devoted to fuels, including natural, artificial and producer gas and oil.

Simple methods of estimated charges for both basic and acid open-hearth furnaces are presented, and these should prove of the utmost value, not only to shop superintendents, but melters as well. The elimination of impurities during and after melting is explained in detail, and other subjects treated include recarburization, melting, method of charging, removal of slag, etc. The special processes such as the Talbot, Monell, Bertrand-Thiel and the duplex are briefly described.

This book is unique in that it contains no advertising matter. It is the first of a series that will be published from time to time, and will be followed by others on blast furnaces and hot blast stoves, heating and puddling furnaces, etc.

J. A. Eden Jr., who has been identified with the forging machinery department of the E. W. Bliss Co., of Brooklyn, N. Y., has resigned and taken a position as manager of a similar department for The United Engineering & Foundry Co., Pittsburg, which company is now manufacturing an improved line of forging machinery for general work as well as die forgings, and also will push the sale of its patent high speed steam hydraulic press.

BLOWING IN STACKS.

Schuylkill Valley Plants, Long Time Idle, Are Now Active.

Reading, Pa., Sept. 28.—Most of the furnaces in the Schuylkill valley are now operating. The Keystone stack, of this city, is being rebuilt and will be ready late in the fall. The stacks at Alburtis, Topton, Temple, Swedeland, Birdsboro, Pottstown, Leesport, Robesonia, Sheridan, Lebanon, Cornwall and Harrisburg are in blast.

The two stacks owned by the Empire Iron & Steel Co., in this city, are idle. It is said that the company intends tearing them down and erecting a modern stack on its site. A new stack is being erected at Coatesville by the Lukens Steel Co. It will have a capacity of 2,000 tons a week.

Swedish ores, chiefly for furnaces in the Schuylkill valley, are now coming into this country in considerable quantities. Contracts have been made for 200,000 tons for the 1909 delivery, and much of it will come by way of Philadelphia this fall. Large shipments of these ores are expected in 1910, although contracts have not been closed as yet.

At Catasauqua, Miss Hellen Hall, daughter of Supt. Hall, of the Empire Iron & Steel Co., applied the torch to the modern stack which the company recently built. It will have an output of from 1,400 to 1,500 tons of iron per week, and about 200 men will be employed. The company now has three furnaces in blast, one at Catasauqua, one at Oxford, N. J., and one at Topton, Berks county.

At Pottstown, No. 3 furnace of the Warwick Iron & Steel Co. was blown in after having been idle since April 14, 1908. The torch was applied by Miss Josephine Roe, daughter of James P. Roe, manager of the plant.

WILL OPERATE DRY DOCK.

Toronto, Can., Sept. 27.—The Polson Iron Works Co., of Toronto, has entered into an agreement with the city of Owen Sound to operate on a percentage basis the dry dock to be constructed there. The Owen Sound people are anxious to secure the ship-repairs of the Canadian Pacific Railway and other large shippers and propose to build a 400-foot dry dock, which can be extended if necessary. The Polson company will install a large plant at Owen Sound, which will be run as a branch establishment of their works here.

An attempt to adjust the strike at the Dominion Coal Co's. mine by the intervention of Lieut.-Gov. Murray has fallen through. The lieutenant-governor on being interviewed by a large delegation of citizens, said that as President James Ross of the Coal Co. would do nothing, the government could not interfere, otherwise than by way of suggestion.

J. H. Plummer, president, and F. P. Jones, manager of the Dominion Iron & Steel Co., have returned to Sydney, N. S., from a visit to the company's iron ore mines at Wabana, Newfoundland. Mr. Plummer reports that the mines and equipment are in excellent condition and capable of producing and handling economically a much larger output than is now produced.

VIRGINIA IRON, COAL & COKE ANNUAL STATEMENT.

The annual report of the Virginia Iron, Coal & Coke Co. for the year ending June 30, 1909, has been issued together with a comparative statement for the three preceding years. The income for 1909 shows gross income of $3,059,000; expenses, $2,801,979; net, $198,080; other income, $71,135; total income, $269,215; charges, taxes, etc., $580,945; deficit, $311,730. The gross income for 1908 was $3,928,621; expenses, $3,449,054; total income, $76,707; charges, taxes, etc., $458,762; surplus, $117,945. In 1907 the gross income was $5,650,406; expenses, $4,665,490; total income, $1,067,368; charges, taxes, etc., $407,361; surplus, $660,007. The gross income in 1906 was $5,088,293; expenses, $4,529,535; total income, $580,836; charges, taxes, etc., $420,392; surplus, $160,444.

The balance sheet shows for 1909 assets of $17,359,088, of which $13,512,139 is in real estate and $2,906,020 in material on hand. The company has a capital stock outstanding $10,000,000; bonds, $5,357,000; bills and accounts payable, $1,127,028, which sums make up the principal items in its liabilities.

Will Furnish Wheels.—The Carnegie Steel Co. will furnish steel wheels for all the cars built in its own shops by the Norfolk & Western railroad during the year 1910. The road has a shop capacity for turning out about six cars a day.

The Youngstown Sheet & Tube Co. is working on several large wire nail contracts, including one from Japan and a 12,000 keg order for the Panama canal. In the past three weeks the company has shipped 23,000 tons of nails.

BAR CONTRACTS

For Next Year Being Made Very Conservatively at Higher Prices.

Pittsburg, Sept. 29.—The leading interest has moved up the steel bar price to 1.45c, Pittsburg, for general business, and this is now regarded as the minimum of the market. The independents are asking 1.45c to 1.50c. There has been some selling into next year at prices ranging from 1.40c to 1.50c upon specific contracts, but no blanket orders have been accepted, owing to the position of the principal maker declining to engage itself for such obligations for more than three months ahead. With several of the large companies, the optional contract for estimated requirements for extended periods has now become a thing of the past. Leading steel bar makers are now taking contracts with agreement as to date of specifications, and with delivery at seller's convenience.

A sale of 1,000 tons of long length Bessemer sheet bars at $27, Pittsburg, for prompt shipment, was made this week. The Carnegie Steel Co. last week booked 2,000 tons of light rails.

The Ohio Fuel Supply Co. has ordered 10 miles of 12-inch pipe for a gas line to be laid from its main line to Hamilton, O.

The Jones & Laughlin Steel Co. has issued a new bar card similar to that recently issued by the Carnegie Steel Co. Although the extras as printed are double those of the Carnegie company, the Jones & Laughlin company will charge half extras, while the Carnegie company will charge full extras.

Changes Name and Officers.—Niven McConnell, formerly president and principal stockholder in the McConnell Engineering & Machine Co., Tacoma, Wash., has disposed of his interests in this corporation to Thomas Skinner and J. A. McRae. The name of the concern has been changed to the Phoenix Engineering Co. Mr. Skinner, who is president of the new corporation, has wide experience as a marine engineer and was at one time in charge of the dry dock at Hongkong, China. The new company will give particular attention to marine work. Mr. McConnell has been appointed superintendent of the works of the Standard Steel Car Co., Butler, Pa.

Harry E. Sheldon, president of the Allegheny Steel Co., Pittsburg, has returned from a three months' trip to Europe.

INDEPENDENTS WILL GIVE DINNER TO JUDGE GARY.

The leading independent iron and steel manufacturers of America have extended, through a committee appointed for the purpose, an invitation to Judge E. H. Gary, chairman of the board of directors of the United States Steel Corporation, to be their guest at a dinner to be given in his honor. This invitation Judge Gary has accepted and Friday, Oct. 15, has been decided upon as the date. The dinner will be held at the Waldorf, New York city, on that evening.

This event has been arranged for by gentlemen not in any way connected with the Corporation, and is a tribute from a large number of those in the same line of business who desire to testify to their appreciation of the value of Judge Gary's influence in bringing more stable conditions in the iron trade, and in insisting at all times that high grade business methods should be followed.

The committee having the dinner in charge are as follows: E. A. S. Clarke, E. C. Felton, J. G. Butler Jr., Jas. A. Campbell, Willis L. King, C. M. Schwab, Powell Stackhouse and John A. Topping.

FLUOR-SPAR PRICES ADVANCE.

Advices from the fluor-spar district of southern Illinois and Kentucky inform us that the demand for fluor-spar is unprecedented and prices on all grades have advanced $1.00 per ton. The miners in these districts had not anticipated the demand.

The present price is still lower than the English spar, however, the present price of American gravel spar being $5.50 at the mines, and with $2.10 freight to Pittsburg the price is $7.60, delivered. English fluor-spar is being offered at $9.60 per gross ton or about $8.57 per short ton.

PERSONAL.

Frank Neale, president of the Kittanning Iron & Steel Mfg. Co., Kittanning, Pa., has returned from a short European trip.

Frederick H. Wick, treasurer of the Ohio Iron & Steel Co., Youngstown, accompanied by Mrs. Wick, left Tuesday for Munich, Germany, where they will join their daughter and spend the winter, on the continent.

James H. Norris, for nine years business manager of the John F. Allen Riveting Machine Co., New York city, has resigned his position. He will spend the next two months traveling. Mr. Norris has not formed any new connection.

W. I. Miller, formerly assistant secretary of the Pittsburg Forge & Iron Co., Pittsburg, has been elected secretary, succeeding F. E. Richardson, who has become president and treasurer of the company, through the vacancy created by the death of Calvin Wells. Benjamin Wells, a son of the late president, has been made a member of the board of directors.

Paul C. Kuegle has resigned his position as chief inspector of the Youngstown Sheet & Tube Co., Youngstown, O., effective Oct. 1. He expects to sail from New York Oct. 9 for Sakchi, India, via Brussels, Paris and Marseilles, and will be employed as chief inspector of construction and general yard master for the Tata Iron & Steel Co. This plant was described in the weekly issue of THE IRON TRADE REVIEW of Sept. 23.

W. L. Loveland, manager of the mining machinery department of Allis-Chalmers Co., Milwaukee, for five years, and associated with that concern for 19 years, resigned this week to become general manager of the Mine & Smelter Supply Co., 42 Broadway, New York. Mr. Loveland joins the company on Oct. 1. He will at once move to New York with his family. H. C. Holthoff, manager of the branch office of the mining machinery department of Allis-Chalmers Co., at Mexico City, will take his place.

OBITUARY.

William Russel, head of the Russel Harvester Co., of Woodstock, Ont., and formerly of Hamilton, Ont., died in Woodstock, Sept. 20, aged 72 years.

William Meyst, aged 63 years, chief clerk of the Berlin Machine Works of Beloit, Wis., for eight years, died at his summer home at Beulah lake, Wis., on Sept. 19 of heart trouble. He was a native of Holland.

Wm. D. Hartupee, aged 55, president of the Pittsburg Valve & Fittings Co., and interested in other important industrial companies, died at Pittsburg Sept. 23. Mr. Hartupee was best known through his connection with the glass industry, being vice president of the Pittsburg Plate Glass Co.

Milo G. Kellogg, founder of the Kellogg Switchboard & Supply Co., Chicago, died there, Sept. 26. He was born April 14, 1849, in Rodman, N. Y.; graduated from the University of Rochester in 1870, and came to Chicago immediately afterward. He went into electrical engineering and was connected with the Western Electric Co. before he founded his own company.

Orlando Metcalf, aged 69, a well known Pittsburg business man, died Sept. 22 after a protracted illness. He started business life with the Fort Pitt Foundry, of Pittsburg, in 1858 and later with Jacob Paul organized the firm of Metcalf, Paul & Co. Subsequently this firm became the Verona Tool Works with a plant at Verona, Pa., and Mr. Metcalf was serving in the capacity of secretary of this company at his death.

Robert Hoe, inventor and manufacturer of printing presses, died in London, Sept. 22. He was born in New York City in 1839, and was the grandson of the original Robert Hoe, founder of the Hoe printing press business known all over the world. Robert Hoe III went into the business of his father as a young man, and developed many important improvements in the art of building presses. When he entered the business, the old cylinder press was in existence, and he evolved from it the double, the double-sextuple and the double-octuple Hoe presses. He also invented presses for color printing.

Kenneth Robertson, aged 64, a prominent blast furnaceman, died at Portland, Ore., Sept. 26, of heart failure. Until a few years ago he was prominently known as an expert blast furnaceman and mineralogist wherever pig iron was made in this country, and was identified with the Sloss interests in Birmingham, Ala., for years, also with the Duluth Furnace Co., in Minnesota, and the Pardee interests in New Jersey. He was born in Madison county, Ala., and enlisted in the Washington artillery of the Confederate army, and served until captured by the Union forces. He was confined in the Federal prison of Camp Chase, near Columbus, O., until the end of the war. Shortly afterward, he entered the school of mines of Columbia university, New York, and graduated with honors, later following this training by opening one of the first chemical laboratories in Pittsburg, with his brother Richard. He leaves a widow, two daughters and two sons. He is also survived by four brothers.

The power plant and warehouse of the Hartford Plow Co., Hartford, Wis., was destroyed by fire, Saturday, Sept. 25, entailing a loss of $30,000. Plans for rebuilding are already under consideration.

The Youngstown Sheet & Tube Co. is sending out a standard wire nail card, so arranged that buyers can have all the necessary data conveniently before them on one page.

Stocks Were Active and Irregular

Last week's stock market was active and irregular. Reading and United States Steel continued to make new high records, but many of the industrials showed considerable falling off toward the end of the week and closed below the closing of the week before. Time money in New York was not so strong; cotton was higher and the market active, wheat fell off toward the end of the week after a strong opening and corn was lower.

Monday the Imperial Bank of Germany advanced discount rates to 4 per cent, the first change since February. Steel Common, Republic Iron & Steel, Chesapeake & Ohio were higher. Tuesday the sales on the New York exchange numbered 1,229,600, of which about a quarter were in Reading. The market reacted violently about noon, but recovered most of the losses before night. Steel common touched 85 and Pennsylvania 147½. Sales exceeded 1,250,000. Wednesday was another million share day. Advances and declines succeeded each other rapidly and the general tendency of the market was downward. United States Steel common and preferred were both higher. In Pittsburg Westinghouse Air Brake was up to 140, the highest price ever paid under the present capitalization. Crucible Steel preferred was also higher. Thursday's market was reactionary, and there was less trading. Air Brake continued upward in Pittsburg. Reported damage by the storm continued to affect the cotton market. Friday was duller, and small declines were noted in many issues. Steel common and Pennsylvania were among the stronger stocks. Saturday was a holiday on account of the Hudson-Fulton celebration.

The rates for call money during the week were 3 to 2¾, the average being close to the maximum. Time money was easier, especially in over-year funds.

Bank clearings for the United States were not so great as in the preceding week, but were 25½ per cent above the clearing for the corresponding week last year. Total clearings were estimated at $3,314,613,731, against $3,532,561,714 the week before. The report of the clearing house banks showed surplus decreased $5,245,350; loans decreased $5,972,300, and deposits decreased $1,791,600. The ratio of reserve was 25.5 against 25.9 the week before. Trust companies and non-member banks showed loans increased $1,617,600; total deposits $8,353,700, and the percentage of reserve 17.7.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo- Sept. 25	Changes in week	Date 1909 Ann.	M't'g.	Stock Outstanding	Basis	Dividend Last Declared	Date Last Div. Pay.
Allis-Chalmers	15	— ¾	Sept.	2	$19,820,000		2½ Q.	
Allis-Chalmers, pr	52¼	—1¾			16,150,000	7 cum		Feb., 1904
American Can	12½	+ ¼	Feb.	2	41,233,300		1¾ Q.	
American Can, pr	82				41,233 300	7 cum		Oct., 1909
Am. Car & Foundry	68¼	—1¾	June	24	30,000,000		1¼ Q.	Oct., 1909
Am. Car & Fdy., pr	118				30,000,000	7 n. c.	½ Q.	Oct., 1909
American Loc	59½	—1¾	Oct.	19	25,000,000	5	1¾ Q.	Aug., 1908
American Loc, pr	115¾	—1¼			25,000,000	7 cum	1¾ Q.	Oct., 1909
American Ship	64		Oct.	13	7,600,000	4	1¾ Q.	Sept., 1909
American Ship, pr	110				7,900,000	7 cum	1 Q.	Oct., 1908
Am. Steel Foundries(new)	60	—1½	Dec.	2	17,184,000		1¾ Q.	
Barney & Smith	30		June	1	2,000,000	4		Sept., 1907
Barney & Smith, pr	100				2,500,000	8 cum	1 Q.	June, 1908
Bethlehem Steel	34½	— ¾	April	6	14,862,000		2 Q.	
Bethlehem Steel, pr	67				14,908 000	7 n. c.		Feb., 1907
Cambria Steel	48⅝	+3⅛	March	16	45,000,000*	3	¾ Q.	Aug., 1909
Cambria Iron	47	+ ¼			8,468,000*	4	1½ S. A.	Sept., 1909
Chicago Pneumatic Tool	32½	— ¼	Feb.	15	6,145,800	4	2 S. A.	Oct., 1907
Colorado Fuel	45⅛	— ½	Oct.	18	34.235,500		1 Q.	April, 1902
Crucible Steel	14¼	+ ½	Oct.	20	24,578,400		3½	
Crucible Steel, pr	82⅞	— ⅜			24,436,000	7 cum	1½ Q.	Sept., 1909
Empire Steel	10		April	27	1,254,770		1 Q.	
Empire Steel, pr	68	—2			2,500,000	6 cum		July, 1909
Fay & Egan	90		Feb.	18	1,000,000	7	3 S. A.	Nov., 1908
Fay & Egan, pr	110				1,000,000	7 cum	1¾ Q.	Aug., 1909
General Electric	167⅛	— ⅞	May	11	65,178,800	8	1½ Q.	Oct., 1909
Harbison-Walker	29½		Jan.	18	18,000,000		2 Q.	Oct., 1907
Harbison-Walker, pr	95				9,690,000	6 cum	½	April, 1909
International Pump	48	— ⅜	June	8	17,762,500		1½ Q.	April, 1905
International Pump, pr	90	—1½			11,350,000	6 cum	1	Aug., 1909
Lackawanna Steel	57	+ ½	March	10	34,971,400		1½ Q.	
Lake Sup. Corp	26½	— ½	Oct.	6	40.000,000			
New York Air Brake	88⅛	+3⅞	June	17	8,012,500	8		Oct., 1907
Niles-Bement-Pond	100		Feb.	3	8,500,000	3	2 Q.	Sept., 1909
Niles-Bement-Pond, pr	100				2,000,000	6 cum	1½ Q.	Aug., 1909
Otis Elevator Co	59		March	15	6,375,300		1½ Q.	Oct., 1909
Otis Elevator Co., pr	100	+1			6,295,000	3 n. c.	1½ S. A.	Oct., 1909
Pa. Steel	68		May	10	10,750,000		1½ Q.	
Pa. Steel pr	116				16,500,000	7 n. c.		May, 1909
Pittsburg Coal Co	20½	—1⅝	March	9	28,104,600		3½ S. A.	
Pittsburg Coal Co., pr	61¼	+ ⅝			27,071,800	7 n. c.		April, 1905
Pressed Steel Car	50	— ¼	Feb.	17	12,500,000		1¾	Aug., 1904
Pressed Steel Car, pr	106	—1½			12,500,000	7 n. c.	3	Aug., 1909
Pullman	194		Nov.	10	100,000,000	8	1¾ Q.	Aug., 1909
Railway Stl. Spring	48¼	—1¾	March	4	13,500,000	2	2 Q.	Oct., 1908
Railway Stl. Spring pr	105	— ½			13,500,000	7 cum	1 S. A.	July, 1909
Rep. Iron & Steel	45	+3	Oct.	20	27,191,000			
Rep. Iron & Steel, pr	106¼	— ¾			20,416,900	7 cum	2½ Q.†	Oct., 1909
Sloss-Sheffield	88	—1½	March	10	10,000,000	5	2 Q.†	Sept., 1909
Sloss-Sheffield, pr	119				6,700,000	7 n. c.	1¾ Q.	Oct., 1909
U. S. Pipe & Fdy	33½	— ⅜	June	23	12,500,000	2	1¾ Q.	Dec., 1907
U. S. Pipe & Fdy. pr	86	+ ½			12,500,000	7 n. c.	½ Q.	Sept., 1908
U. S. Steel	84½	+1⅛	April	19	508.302,500	3 n. c.	1¾ Q.	Sept., 1909
U. S. Steel, pr	128¾	+1⅛			360.281,100	7 cum	¾ Q.	Aug., 1909
U. S. Steel, 5s	114¾				463,798,000	5	1¾ Q.	
Va. Iron, Coal & Coke	70	—4½	Sept.	21	9,073,680		5 A.	
Westinghouse Elec	86	—1	June	16	27,173,200	10		Oct., 1907
Westinghouse Air Brake	136	+5	Oct.	5	14.000.000*		2½ Q.	Oct., 1909

Par value of shares, $100, except those starred (*), $50.
†Includes deferred dividend of ¾ of 1 percent.

Exports of gold from New York were $10,000, against imports of $61,509. Exports for the year up to Sept. 25, were $76.669,192, against imports of $6,786,617. Failures during the week 183, against 213 the week before and 279 for the corresponding week last year. Liabilities in commercial failures for the month up to Sept. 24 were $5,931,862, against $13,684,066 for the corresponding period last year. During the fortnight ending Sept. 13, the surplus of cars was reduced by 38,175, leaving 68,502 idle cars, which is the smallest surplus since panic times.

The whole number of shares dealt in on the New York exchange was 4,555,969, against 5,402,700 the week before, and 5,577,800 the corresponding week last year. Bonds, other than government bonds, were sold to the value of $14,866,000, against $21,262,000 the week before, and $18,674,000 the corresponding week last year.

Copper Stocks.

New York.—Amalgamated copper closed at 83, decrease ⅞.

Boston.—Butte Coalition closed 25½, decrease ¼; Calumet & Arizona closed 104, decrease 1; Calumet & Hecla closed 685, increase 10; North Butte closed 61¾, increase 3; Quincy closed 91½, increase ½.

Financial Notes.

The American Iron & Steel Mfg. Co., Philadelphia, has declared its regular quarterly dividend of 1¼ per cent on common and preferred, payable Oct. 1 to stock of record Sept. 22, and also a special dividend of 6 per cent on the preferred.

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January	5,506
February	5,346
March	5,396
April	5,508
May	5,533
June	5,551
July	5,572
August	5,597

September 30, 1909

BRITISH AND AMERICAN RAILWAYS.

Less than a generation ago, a comparison between American and British railways was in favor of the latter at all points, but a change has occurred, and there are few respects in which American railways do not make an extremely favorable comparison with the British. American railways have had to defend themselves in recent years against a popular demand for lower rates for the services they render, a demand arising chiefly from contemplation of their large earnings and heavy expenditures, while British railways of late have had to assume the offensive and claim the right to advance their charges to the public, although comparisons show that already British railways charge much more than American railways for similar services. The American public is asking the railroads to reduce the already low rates, on the plea that the railroads can afford to do so; the British public is being asked to permit an increase in rates, because the railroads need the money.

American railroad earnings, in recent years, have been increasing; British railway earnings have been decreasing, and the issue in England is not whether something shall be done, but what shall be done, the favorite prescriptions offered being pooling and government ownership. Gross earnings of British railways have been increasing, but very slowly, say an average of 2½ per cent a year, while expenses have been increasing more rapidly, and net earnings are slowly but surely approaching the vanishing point.

American railways experienced most of their troubles in the early days. In the United Kingdom the reverse was the case; a magnificent system, judged by the then standards, was built up. Finally, however, there came a parting of the ways. In the hard school of adversity of the 1893 depression, American railroad managers learned how to save themselves; British railroad managers at about that time had comparatively ample funds at command, and they spent them lavishly but not wisely, increasing capital charges, but not increasing earning power sufficiently to meet increased costs of operation. American railways had a scare in the 1907 panic, and too frankly confessed their fear that they would not be able to continue their improvements. The scare is over and they have resumed their expenditures, not, as yet at the highest previous pace, which was in 1906, but already at better than the average pace of the eight years following the 1893-8 depression.

The position of the British railways is in striking contrast; net earnings have been steadily decreasing, new capital cannot be secured, and the choice is between trying the last resort of advancing rates, which are already very high considering the performance of American railroads, or of giving up the game altogether, and letting the government step in and buy and run the railroads, whether it gains or loses in the operation. Fifteen or 20 years ago, as intimated, the British railway system was easily far ahead of the American, even allowing for all the differences in physical conditions in the two countries; since then the ground gained has been lost, and the present trends are towards less prosperity for the British railways and greater prosperity for the American.

All the causes for the reversal are doubtless not discernible even to the highest authorities, but some are patent to all. The one which is perhaps most commented upon is that British railroad managers have tied up capital in second, third and fourth track, in order to increase capacity, because it involved the use of less intelligence to do this than to increase train loads and train frequency. American railroad managers, it is asserted, were less favored—perhaps one ought to say less tempted—by an abundance of fresh capital being available in the formative period from which the present situation has resulted, and therefore bent their energies to the less expensive methods of increasing capacity, by enlarging terminals, increasing the size of cars and locomotives and improving operations whereby trains are run closer together.

If this be a pertinent explanation, one desires immediately to turn to comparative statistics: what is the comparison between the United Kingdom and the United States in average freight train load, density of traffic, and all the rest? The inquiry does not bring satisfaction, but instead discloses a fresh cause of the unsatisfactory condition of British railways: there are no such statistics for British railways. One is blandly informed that British railroad managers have felt that such information should not be given to the public, and in order that it may be assured that it will not be, the

statistics are not gathered. British railroad managers do not know whether their trainloads are increasing or decreasing, except perhaps by enlightened guesswork; they cannot compare results between one system and another, or the average of all with the average in the United States. How is one to strive earnestly for a goal if he can neither see the goal nor observe the progress he is making?

The American iron and steel trade has numbered, and will continue to number, the railroad interests as its best customer; the British iron and steel trade sees but a small fraction of its total production going to British railways, although its shipments of railroad material to other countries are relatively large. The iron and steel demand of American railroads in the next few years promises to be closely along the lines which have been mentioned as distinguishing their policy from that of the British roads, to increase the traffic over the pair of rails. The great era of new railroad building is largely past, but no more than a fair and intelligent start has been made at increasing the traffic over the track, once it is laid. While the average freight train load has doubled in half a generation it is only 356 tons, and recent experiments by the Pennsylvania and New York Central have shown a single locomotive capable of hauling, at good speed, more than 5,000 tons of live load. To make such performance general the work must be continued of building steel cars and big locomotives, of building stronger bridges and of laying heavier and tougher rails on a more trustworthy foundation.

RAILWAY RATES AND IRON AND STEEL PRICES.

In a booklet just issued under the title "The Diminished Purchasing Power of Railway Earnings," the necessity of an adjustment of rates to meet present industrial conditions is discussed by C. C. McCain, chairman of the Trunk Line Association, who presents a mass of statistical information in support of the following general contention:

The 10 years or more which have elapsed since the resumption of industrial activity that began some time in 1897 have been characterized by changes in rates of wages for substantially all kinds of labor and in the prices of most commodities, which amount to a profound and material alteration in the value of money. Wages of railway labor, prices of railway materials and supplies and prices of commodities carried by railways and of those produced by the purchasers of railway transportation, have rapidly increased. This is equivalent to a decrease in the value of the money in which railway charges are paid, for the appreciation of commodities *is* the depreciation of money. Railway rates have not been adjusted to this diminished value of money. The involuntary and unsolicited reduction in railway rates has gone so far as seriously to threaten the stability of railway wages and that of the whole railway industry. Some adjustment through compensatory advances in money rates (in other words, nominal rates) is, therefore, absolutely necessary.

A carefully prepared estimate which we made a year or so ago indicated that about 35 per cent of the country's iron and steel output depends for ultimate consumption upon the railways and closely related interests are also large consumers; hence the question of maintaining their purchasing ability is one of vital importance to this industry. The past two years have indicated pretty clearly just about what may be expected of the steel trade when the condition of railroad finances renders impossible all purchasing beyond their most urgent requirements. Similarly, the immediate past furnishes ample evidence of the buoyant manner in which the steel industry responds to the return of healthy railroad buying, and makes clear the latter's predominating position among the customers of our furnaces and mills. For this reason, even though they are among the largest purchasers of transportation, iron and steel producers are interested in seeing that the railroads receive fair treatment and that their returns are commensurate with their enormous capital investment and heavy operating charges. Quite likely some re-adjustment of rates to meet new conditions is needed. Mr. McCain's statistics seem to prove his case.

However, there is room for suspicion that the figures given in this booklet hardly represent the matter fairly. Prices on various materials entering into the manufacture of railway supplies are given for 1897 and 1907, the averages compiled by the United States bureau of labor being taken. Some of the principal iron and steel products appear as follows, prices being per ton:

	1897.	1907.	Per cent Inc.
Furnace coke	1.62	2.83	74.69
Ref. bar iron	22.00	35.00	59.09
Bess. pig iron	10.13	22 84	125.47
Fdy. pig iron No. 2	10.10	23.87	136 34
Steel billets	15.08	29.25	93.97
Steel rails	18.75	28.00	49.33

During the same period, the report further shows, freight rates on bar iron advanced but 13 per cent, on pig iron about 25 per cent, and on rails 8 per cent, while on billets the rate showed no change between Chicago and New York, the route taken as the basis of comparison. Clearly these figures indicate a most remarkable spirit on the part of the railroad interests, a willingness to assist the steel trade to market a golden harvest without any serious effort to share. The public never has credited the railroads with such a disposition and is hardly willing to do so now.

The important fact in connection with the above table is that the years 1897 and 1907 are singularly fortunate for the purpose in hand; much more so, in fact, than would have been 1898 and 1908, statistics for the latter year being available several months before the appearance of this booklet. In 1897, prices were at an extremely low ebb, while 10 years later they were abnormally high; hence the percentage of increase is excessive and will not hold good over any extended period. By taking average figures for iron and steel products in 1899, for instance and comparing them with the average of the current year, a heavy decrease could be shown, and an equally strong argument presented for a *decrease* in freight rates. The point of it all is that no fair conclusion can be drawn from such a comparison; to prove anything at least the average of a term of years must be taken. If such a course had been followed in this booklet, the evidence would doubtless have led to similar conclusions, but the figures would not have been so extreme and would have carried greater weight.

The Chicago Railway & Equipment Co. has declared a quarterly dividend of 1¾ per cent, payable Oct. 1.

COPENHAGEN CONGRESS OF THE INTERNATIONAL SOCIETY FOR TESTING MATERIALS, HELD IN COPENHAGEN, SEPTEMBER 7 TO 11, 1909.

By Dr. Richard Moldenke.

Copenhagen, Sept. 11.—A great congress in a magnificent city. This sums up concisely the meeting of the International Society for Testing Materials held in Copenhagen, Sept. 7 to 11. Already on Monday several hundred delegates had arrived and dinners, committee meetings and a general roundup of the work to be done were in order. The council of the society, the American member of which is Dr. Chas. B. Dudley, president of the American Society for Testing Materials, was entertained at dinner by the king Monday evening. Badges, guide books, tickets for the various functions, etc. were distributed, and free transportation was provided by the city railways. Owing to the fact that parliament was still in session, the meetings of the congress were held in Raatshous or Town Hall. This is a magnificent building of immense size, decorated in a most lavish manner. The section meetings were held in the halls of the magistry in about the same surroundings as our legislative chambers in the state capitols. About 900 members of the society had subscribed to the congress and probably 700 attended. Those from the United States in attendance were as follows:—Dr. Chas. B. Dudley, Walter Wood, Prof. W. K. Hatt, Richard L. Humphrey, Prof. A. N. Talbot, Tinius Olsen, Wm. R. Webster, L. H. Frey, Prof. Richards and Dr. Richard Moldenke.

The opening session was held in the grand hall of the university Tuesday morning. At 10 o'clock the room was filled and many were standing. Shortly thereafter, a procession, headed by the students in red sashes, marched in, accompanied first by the king and queen, then the crown prince and princess, followed by the princesses of the royal family. They were seated on a platform built for the members of the royal family. Next followed the delegates from the various governments in brilliant uniforms, even China and Japan being represented. A body of students on a balcony then sang a cantata with orchestral accompaniment, which was followed by an address of welcome delivered by the crown prince in French. Alexander Foss, of Copenhagen, the president of the congress, then delivered an able address in German on the work of the society. He directed attention to the vast influence of the organization and the wonderful work it has done to bring about the systematic improvement of materials that are used by transportation and manufacturing interests. He emphasized very clearly that the testing of material depended entirely upon proper specifications and the society was committed to the preparation of international specifications for materials whenever these were possible. In thanking the royal family for their presence at the opening session, Mr. Foss proposed a standing salute and the customary nine "hochs" were given for the king with great enthusiasm. These "hochs" were appreciated by the king, who is a very simple and pleasant looking man.

After the presidential address, Paul Larsen read a paper on "The development of the cement industry of Denmark," which was as long as it was interesting. Another song of salutation to the king concluded what was a very stately function. The evening of the first day was rounded out by a reception held under the auspices of the Danish Engineers' Society at the Royal Shooting Club.

The Metal Section.

The Wednesday morning meeting of section A, on metals, was opened by Director O. F. Busse, of the Danish state railways. Prof. E. Heyn read a report on the progress of the art of metallography since the Brussels congress. Prof. Le Chatelier objected to the number of names used for the several microstructural parts of iron and suggested the elimination of a few. Mr. Stead spoke very interestingly of the eutectic of phosphor-carbon-iron compounds and their curious behavior when under moleculer pressure. The committee was asked to continue its work and report at the next congress. Prof. Leon Guillet, Paris, then presented a report on special steels, which was discussed. Lunch was served in the basement of the Raatshous. In the afternoon, W. R. Webster, on behalf of committee 1, presented specifications on iron and steel adopted by America, Germany and England, and asked for further suggestions. A resolution was adopted thanking the committee for its work, and the unification of these specifications in the near future was urged. It was also recommended that Russia and other countries be considered for representation on the committee which was arranged for, and after considerable discussion the resolution was adopted. Mr. Lloyd, on behalf of the committee, then presented a resolution looking toward the unification of pig iron specifications, and he urged that grading by fracture be eliminated entirely, and that pig iron be handled only by analysis. Dr. Richard Moldenke was asked by the chairman to discuss the resolution and the same was then adopted without further comment. Mr. Wood was asked to prepare unified specifications for cast iron pipe and to present them to the several countries for adoption. The report of the committee on the nomenclature of steel was next taken up and discussed at length by Profs. Richards, Le Chatelier, Mr. Harboard and others, and so many objections were raised to the report, that it was ordered referred back to the committee for revision. It will be presented again at the next congress. The report on "Specifications for the purchase of copper" was next read and discussed, after which the meeting adjourned. About 500 of the delegates then visited the Royal Porcelain Works and were greatly interested in the casting process used in the production of Danish china and porcelain goods.

The American delegates went by automobile to the American legation, which is located near the king's palace and were entertained by Minister Eagan, whose charming daughter poured tea for the party. While there the delegates met Dr. Cook of North Pole fame and were photographed with him and the United States minister. In the evening the delegates were tendered a reception

by the municipality in the town hall.

On Thursday morning Mr. Guillet continued the discussion of specifications for the purchase of copper and presented a resolution authorizing the unification of specifications, and recommended also that the committee take up bronze and brass in a similar way. This resolution was adopted.

Wrought Iron Pipe Specification.

Danish specifications for wrought iron pipe were presented by A. J. Karsten and referred to committee 1 for final action. Mr. Robertson called attention to the fact that if the standardization of threads were included, great care should be exercised in formulating a report, inasmuch as the standardization of threads would be found to be very difficult to bring about. Dr. Ludwik next presented a report on his steel cone hardness testing method. This was discussed at length and sharply criticised by some of the delegates. Mr. Benedict did not find the method adapted for hard materials, but believed it good for the softer metals. Prof. Retjo defended the method and showed where criticisms were based on erroneous observations in making tests. Prof. Dibbruck objected to a multiplication of methods holding that the Brinell ball method was sufficient. After lunch the subject was still further discussed, and it was decided to appoint a committee to study the relation of chemical wear to hardness in materials. The report of tests of cast iron made by the Sulzer brothers, Winterthur, Switzerland, was presented by Mr. Meyer and briefly commented on by Dr. Moldenke.

Commission Report.

The report of commission 25 was next presented by the chairman, Dr. Richard Moldenke, and is as follows:

Your commission to establish uniform methods of testing cast iron and finished castings, begs to report that since the Brussels congress considerable attention has been given the subject of testing cast iron in various countries, and that as the nature of this material becomes better known, there is greater likelihood of a basis of agreement upon the methods of testing to be used, being arrived at eventually.

Elaborate tests have been made in Germany which in the main agree with those carried out some years ago in the United States, and as a consequence, the three sizes of test bars specified, have been replaced by a single one. This is very important, as it shows an agreement with the American tendency to treat cast iron from an entirely different standpoint than steel, or other metals.

It is a well known fact that no material that we know of shows such a lack of homogeneity, or such a range of varieties from widely differing extremes in physical characteristics, as cast iron. Consequently, every painstaking and elaborate series of investigations of a national character helps to bring this condition of affairs home very closely to those who test and use iron castings. The published results of one nation do not seem to carry the weight they might be expected to have in other countries. Every society or national body of engineers appears to have to dig this information out for itself, and perhaps after all this may be the best in the end.

It is with pleasure, therefore, that we can report that in view of the evident impossibility of obtaining actual strengths existing in the several parts of a casting, by means of test bars either loose or attached, the results of the most recent investigations of Germany and the United States confirm the desirability of judging castings by the quality of the metal and its suitability for the purpose. This is shown by a standard test bar cast under the most perfect conditions possible, so that possible influences of manipulation may be excluded, and the metal used for the work is given full opportunity to show its intrinsic value. Naturally, where it is possible to test the castings themselves, this is resorted to, as witness the specifications for American car wheels. Again, even with perfect metal as shown by a standard test bar, improper shop conditions may spoil the work. Yet on the whole, experience, as based on thorough investigation has shown the value of knowing exactly what the metal is that goes into the castings, rather than attempting to attach coupons or place test bar patterns of various kinds into the molds themselves.

Perhaps the nearest approach to the latter has been obtained by the use of hollow prisms or cylinders with the same metal, and the planing out of test strips from the walls. In the United States cylinders from which test bars were cut have been used for a long time, and are still employed in the case of munitions of war. As the cylinders have the same thickness as the projectiles, it practically becomes the taking of a piece of the casting to see how strong it is.

The German and American test bar is of practically the same diameter, and is cast under nearly the same conditions, differing only in the manner of pouring, and the fact that the German bar is twice as long. Denmark still makes use of the very long bar, loaded gradually at the center until a maximum called for has been reached. This method was formerly much used in the United States, but found too elaborate for commercial conditions. Italy makes use of a very short bar, heavily loaded. It is interesting to note that the 1-foot bar of the United States is half way between the Italian and the German test pieces. Italy further specifies a drop test on its bar, which is of interest. Denmark requires a hammer test for softness and absence of brittleness. Germany leaves out a tensile test. America makes it optional, and Italy includes it in the specifications.

Regarding the testing of castings, it may be said that cast iron pipe takes a prominent place, a number of countries having specifications for this important branch of the casting industry. The international character of the business is bringing about much thought on simplifying the several specifications, so that greater uniformity may result as between the several countries that ship pipe abroad.

Perhaps, however, the easiest point for agreement between the countries specifying cast iron products, might be found in the basis of the whole industry, namely in foundry pig iron, and the American members are presenting to this congress the specifications newly adopted by that country, after long study and discussion, from which there will be seen that every possibility of chance has been eliminated, and a carefully divided range for every element with its variation to be allowed, is given. Perhaps a study of these specifications by the various countries may lead to suggestions and modifications which will result in an international set of specifications for foundry pig iron, which will facilitate the purchase and sale of foundry pig iron the world over.

Mr. Greiner objected to the use of a small test bar for the purpose of judging the quality of large, complicated castings. Dr. Moldenke in reply pointed out the impossibility of judging anything but the quality of the iron that goes into a casting by means of a test bar, and that the art of the founder has to do the rest. He urged that European founders consider the purchase of pig iron by chemical specification only, and finally his motion that all the cast iron com-

mittees of the International Society be merged into committee 1, prevailed.

"Magnetic and electrical properties of materials in connection with their mechanical testing" was next considered, and a commission created to study the relation between chemical and electrical methods of testing materials. Prof. Pierre Weiss, Zurich, discussed the subject of "Ferro-magnetism and the testing of metals and alloys" at great length. Dr. Walter Rosenhain presented a report on "Slag enclosures in steel," which was discussed by Messrs. Guillet and Stead, and a commission was created to study the subject and report at the next congress. A meeting of those interested in international specifications for iron and steel was held during the afternoon, and the visiting delegates attended a theater in the evening.

Friday.

Professor Scheule presented a report on tests of endurance and quality of copper wire. This referred particularly to the question of trolley wire. Prof. Le Chatelier remarked that the subject of the endurance of this material was the most important that the congress had before it. While there were many tensile and bending records, only a few records giving endurances were available, and he suggested the appointment of a commission to consider this subject, which was favorably acted upon by the society. The discussion of impact tests as reported upon by Mr. Charpy, took up most of the session, both morning and afternoon. Mr. Charpy stated that the work of the German association for testing materials was the best known, and that its standard should be adopted. After much discussion the Charpy resolution was adopted, with permission to use any other standard, but to co-relate the results. Furthermore, a standard test piece was adopted as described in Mr. Charpy's paper.

Prof. Exner, of Vienna, called attention to the necessity of greater cooperation of the governments with the work of the society so that the building and operation of automobiles would be better controlled. He directed attention to the fact the railroad equipment is subjected to the closest scrutiny, while on the other hand, equally fast running automobiles are allowed in the highways without any supervision whatever as to their construction and operation by experts. A series of metallographic terms was also adopted as a standard, the metallographists in attendance at the congress having held a conference and decided upon standard terms for international use. A commission was also created for defining such terms as tenacity, malleability, etc., so that these words would be used in the same sense in all countries.

Closing Session.

After presenting several resolutions relating to the internal financial affairs of the society, President Foss turned over the meeting to the chairman of the several sections, who presented resolutions resulting from the discussions of the congress. These were unanimously adopted. In addition to those already reported, there were several relating to galvanizing and tinning iron for protection against rust, as well as the testing of full-sized specimens of timber. The auditing committee reported favorably and the invitation of the American society to hold the 1912 meeting in New York was accepted. The invitation of Russia for the succeeding congress was also favorably acted upon. Dr. Chas. B. Dudley, president of the American Society for Testing Materials, was then enthusiastically elected president of the international association. A final dinner was held at Marienlyst, and a further trip was planned the week following for those who were interested in harbor improvements.

SECAUCUS FURNACE WILL BE BLOWN IN.

The Secaucus furnace of the Hudson Iron Co., located within a few miles of New York, will be ready for blowing in about Feb. 1, with a daily capacity of 225 tons. A new blowing engine is being installed this week, but considerable of the work of reconstructing the furnace remains to be done. The company still has some iron on its yards. At the Forest of Dean ore mine, owned by this company, operations are at maximum capacity, shipments going forward at the rate of about 6,000 tons per month.

THOMAS IRON CO. ADVANCES WAGES.

The Thomas Iron Co. has announced an advance of 10 per cent in the wages of all its employes numbering about 2,000, and other furnace interests of the Lehigh and Schuylkill valleys either have or will shortly make similar advances, restoring the level to what it was before the depression.

The Dayton Coal & Iron Co., Dayton, Tenn., will rebuild their No. 1 furnace. Ladd & Baker, Inc., Real Estate Trust building, Philadelphia, Pa., are the engineers.

TENNESSEE COMPANY

Will Have Ample Wa er Supply—How Pig Iron Output Was Increased.

Announcement is made by the Tennessee Coal, Iron & Railroad Co. that plans have been decided upon for providing the Ensley plant with an adequate water supply by the construction of a reservoir having a storage capacity of some 2,500,000,000 gallons. This will be accomplished by building a 500-foot dam, about 90 feet high, across Village Creek some six or seven miles from Ensley, giving a lake about five miles long and following the course of this stream and its tributaries. It is also announced that a by-product coke plant with a daily capacity of about 3,000 tons will be constructed by this company in the early future.

In this connection it is interesting to note that the Tennessee company has succeeded in materially increasing its pig iron output by reason of an improved ore supply. During the late depression, when blast furnace activities were at a low mark, ore mining operations were continued at close to full capacity, with the result that stocks of fully 750,000 tons were accumulated. With these to fall back upon, the Tennessee furnaces have not suffered from their customary ore shortage when operating to maximum and consequently have been able to show remarkable production records.

MACHINERY EXHIBITION

The Machinery Exhibition Warehouse is the name of an establishment now nearing completion in Chicago. It is located at Thirty-seventh street and Ashland avenue, and when the building is completed, about Nov. 1, it will be offered to manufacturers for the exhibition and storage of machinery and heavy metal products. The building, which is 400 x 100 feet, was projected by the Pfannmueller Engineering Co., and as far as they know it is the only establishment of the kind in the United States. It will be provided with a 25-ton electric crane and wired for electricity so that any exhibitor may connect his exhibit with motors and show the machinery in operation. The building has direct connection with all the railroads, and the company claims exhibitors can save considerable sums in switching charges and cartage by the use of their building. In connection with the building there is a large yard for the exhibition of rough machinery and metal products that do not have to be kept under cover. The company will also lease parts of the building for machinery storage.

AMONG MACHINERY MAKERS.

PITTSBURG.

Steel Interests Are Equipping for a Long Run of Activity.

Office of THE IRON TRADE REVIEW,
510 Park Building, Sept. 28.

In a number of directions it is apparent that large steel interests are anticipating a period of heavy business in the next several years, and are bending efforts to increase capacities at this time. Some important inquiries for heavy mill machinery representing these programs of improvement are now before builders of equipment. In some cases especially prompt delivery of machinery is asked, but in this respect some difficulty may be encountered, as some of the large builders in this district are filled up with work for several months ahead. Among the important contracts now pending are those for extensive improvements to the works of the Bethlehem Steel Co., at South Bethlehem, Pa., the Inland Steel Co., at Chicago, and other companies. Some new steel plant projects are under consideration.

The smaller jobbing foundries in this district, which have not been operating very actively, are now more clearly feeling the revival of business, and are having a better melt. The specialized shops are busy, those of the heavy machinery builders and roll makers being particularly active.

Foreign manufacturers who prefer American machine tools in their shops are placing orders for such equipment through agents in this country, instead of through the domestic sellers. This is being done to avoid the discounts and commissions to dealers in foreign countries which in some cases are a very appreciable portion of the cost of a tool to buyers.

Among the principal inquiries for mill equipment now in the market is that of the Bethlehem Steel Co. for a 28-inch universal mill, a 22-inch bar mill and a 22-inch structural mill, together with auxiliary machinery, such as tables, transfers, etc., which are to be included in the new continuous shape mill to be built at South Bethlehem, Pa. The Bethlehem company is anxious to proceed with this improvement and has requested that deliveries be made very promptly.

The Allegheny Steel Co., Pittsburg, is planning a decided enlargement of its boiler tube department at Brackenridge, Pa., which will give it an estimated capacity of about 2,000 tons monthly. The Allegheny Steel Co. recently acquired the plant of the Reliance Tube Co., and this is now known as the Reliance department of its operations.

The Baltimore & Ohio Railroad Co. has awarded contracts for extensive shop improvements at Benwood, W. Va., which will practically entail the rebuilding of the plant and will require an expenditure of about $150,000. Included in the new building to be erected is a machine shop, blacksmith shop, boiler and engine rooms 60 x 184 feet, which will require some new equipment. The buildings will be of brick and concrete construction. It is expected that the improvements will be completed about Feb. 1, 1910.

An additional capacity of about 25 per cent in the hot pressed nut department is provided by the additions just completed to the plant of the National Bolt & Nut Co., at Sixty-first street and the Allegheny Valley railroad, Pittsburg. The company now has an output of between 5,000 and 6,000 kegs per month operating single turn.

The Duquesne Steel Foundry Co., with a plant at Kendall Station, Pa., is adding to its melting equipment an additional acid open-hearth furnace of 20 tons capacity. The new furnace will give the company a total of three furnaces, each of the 20-ton type. The company is enjoying a very favorable run of orders.

NEW YORK.

Moderate Improvement Continues with Prices Remaining at Old Levels.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St, Sept. 28.

The machinery market of the past week has presented no unusual features. The trade in general is showing a steady, moderate improvement, and the volume of current business is all the while growing larger, although every interest now and then finds a week or a fortnight when the apparent tendency is backward. Aside from the recent advance in the price of leather belting, an average of about 10 per cent in keeping with the higher cost of the raw material, old schedules are being continued. Scattered advances may develop from time to time, but for the most part manufacturers are inclined to resist the temptation imposed by increases in other lines of production, at least until their plants are running more nearly up to maximum.

Evidence of the sharp increase in steel mill equipment forced by the present demand for record production continues to accumulate. The Crocker-Wheeler Co., Ampere, N. J., has sold the recently re-organized Southern Steel & Iron Co., Roger, Ga., two 250-kilowatt, engine type, 550-volt, direct-connected generators and 275 horsepower in 500 volt, direct-connected motors. Another order recently booked by this interest was from the Youngstown works of the Republic Iron & Steel Co., calling for a 600-kilowatt direct-current generator, which will be added to a plant consisting of two 300-kilowatt generators of this make.

Important additions are being made to the equipment of the Mosher Water Tube Boiler Co., Ossining, N. Y., among recent acquisitions being a 14-foot flanging press. The company's shops are busy on stationary type work, 22 boilers being under construction at the present time.

Plans have been prepared for adding to the plant of the Hartford Machine Screw Co., Hartford, Conn., by carrying the present main factory building up two stories.

At a bid of $73,900, Henry R. Worthington, 115 Broadway, has been awarded the contract for supplying the department of water supply, gas and electricity, New York city, with two large pumping engines for the Ninety-eighth street station.

The Electric Light & Power Co., Portland, Me., has closed a contract for supplying a neighboring woolen mill with 2,000 horsepower, as a result of which considerable development of its water power privileges will be done.

In connection with the development of its submarine iron ore deposits at Wabana, Newfoundland, some important additions are being made to the equipment of the mines of the Nova Scotia Steel & Coal Co., principal offices of which are at New Glasgow, N. S. Contracts have been placed abroad for hoisting and other equipment to replace and supplement that now in use.

In the announceemnt recently made by President George G. Crawford, Birmingham, Ala., of the improvements to be made by the Tennessee Coal, Iron & Railroad Co. in the Ensley district, particularly with regard to the securing of an adequate water supply and additions to the coke capacity of that interest, there is the prospect of

heavy purchasing along certain lines. This matter is in the hands of Mr. Crawford.

CINCINNATI.

Machinery Not So Active in September as in August.

Office of THE IRON TRADE REVIEW, First National Bank Bldg., Sept. 28.

The month of September appears to have been somewhat less active in the machinery lines so far as orders were concerned than the month of August. Considering, however, that August was an extremely active period and that the demand during that month exceeded expectations the September business cannot be regarded as disappointing. There has been a fair amount of business booked and the inquiry continues sufficiently large to maintain the cheerful outlook for the future which has prevailed for the past three months. There has been no reduction in the activities and the manufacturers are striving for output. There appears to be no hesitancy to make stock and in fact a number of the shops are glad to be able to have a few machines for immediate delivery. A number of the manufacturers are behind on orders and are sold up to the first of the year and beyond. It is understood that a considerable amount of business is pending in Detroit this week and a number of machine tool men are on the ground looking after their interests.

A few orders for engines and boilers have been placed and there is some revival in the inquiry for power installations, but this branch of the machinery industry remains rather quiet in this market. The boiler business has been less active during the past month and there are reports of irregularity in prices in spite of the advancing tendency in plates.

The shortage in the supply of labor in the machine shops still continues, but shop forces are being augmented as rapidly as the proper kind of men can be secured.

A representative of Ryerson & Son was in the city during the week inspecting available sites for the location of a plant in this city. It was understood that a location was being looked for suitable for the manufacture of machinery. The industrial bureau officials were working on the proposition with a view to securing a desirable location for this new industry here and endeavoring to secure the location of the proposed plant in this machine tool center.

MILWAUKEE.

Activity in New Construction—Competent Labor is Hard to Get.

Milwaukee, Wis., Sept. 28—Manufacturers in this district are finding it difficult to get enough competent workmen to take care of the rapidly increasing business. This is the case with the Filer & Stowell Co., and another instance of this condition is the Kissel Motor Car Co. of Hartford, Wis., and its allied plow, farm implement and wagon works. Display advertisements are being used to attract competent men and special inducements are offered.

The amount of new construction work is surprising, and is a good criterion of the times. The Progressive Metal & Refining Co. has started work on a $15,000 plant on Barclay street, between Washington and Scott streets, Milwaukee. The shop will be 80 x 150 feet in dimensions, one story high. Provision is made for additions in the future. The Wisconsin Foundry Co. is building a $5,000 pattern shop on Thirty-second street, between Hadley and Locust streets. The Sivyer Steel Casting Co. has purchased a tract of approximately two and one half acres on Burnham street, at Thirty-seventh avenue, and plans to erect a foundry probably in the spring of 1910. Plans are being prepared and work will be done gradually. This company has been using part of the foundry held under lease by the Northwestern Malleable Iron Co., but this company is so pressed for room that the Sivyer company must seek its own plant. One malleable melting furnace has been used since Jan. 1, at which time the Sivyer company began business.

The Racine Brass & Iron Co. of Racine, Wis., is erecting a large addition. The need of larger quarters was apparent some time ago but the company proceeded carefully. Now, however, it believes the time has come to go ahead.

The huge shop of the A. O. Smith Co., manufacturer of pressed steel automobile frames and parts, at Keefe avenue, Twenty-seventh and Thirtieth streets, is under roof and part of it will be ready for occupancy on Dec. 1. The shop is 800 x 350 feet in dimensions, one story high, of solid concrete, brick and steel. All work is being done by the company on "day work" and first ground was broken July 9. The office will be 56 x 148 feet, two stories high, and power plant and enameling shop 70 x 400 feet. A 700 horsepower Allis-Chalmers gas producer engine will be the leading item of equipment.

The Antigo (Wis.) Electric Co. has installed two Lyons safety combination tubular and waterpipe boilers, made by the Lyons Boiler Works of Depere, Wis. The capacity is 250 horsepower each. The Lyons works are constructing seven penstocks for the power plant of the Northern Hydro-Electric Power Co. at High Falls, Peshtigo river. Five are 8 feet in diameter and 100 feet long, the remainder 3 feet by 95 feet. Bates & Rogers Co. of Chicago have the general contract for equipment.

NEW STEEL CASTING PLANT.

The Inland Steel Casting Co. has just completed the construction of its new plant at Terre Haute, Ind. The main foundry building is 300 feet long and 75 feet wide, with a single span roof. Particular attention has been paid to the ventilating and lighting. Lantern ventilating shafts have windows of full length, which are all swung by a mechanical device controlling both ventilation and light. Connected with the main foundry building is the core room, 65 feet long by 35 feet wide, with cement floors and large wall ovens and two large truck ovens built on the outside. This gives full working capacity in the main core room, there being no space taken up by the ovens.

The pattern shop is connected with the main building and is 75 feet long by 45 feet wide, and is equipped with the latest tools for the manufacture of both master wood and metal patterns.

Another building 30 x 30 feet contains a Danic sand blast, together with tumbling barrels and the stationary blasts. The air for the blast is furnished by an American Pump Co. compressor having a capacity of 300 cubic feet per minute and a pressure of 100 pounds per square inch.

Crude oil, used by the company in the manufacture of its steel castings, is pumped from two storage tanks having an aggregate capacity of 20,000 gallons, by means of a small rotary pump, to a receiving tank, from which it is fed to the furnaces by gravity.

An office building, 30 x 30 feet, is also connected with this plant.

The Empire District Electric Co., Joplin, Mo., has placed an order with the Westinghouse companies in Pittsburg for two turbine engines of 10,000 horsepower each, two Le Blanc condensers, two electric generators of 10,000 horsepower each and the equipment to distribute the power to various zinc mines and factories.

THE MODERN STEEL SHEET PILE

A History of the Development and Application of the Earliest and Modern Types.

By J. F. Springer.

From the earliest times men have been excavating for one purpose or another. Now it is to place a foundation on the solid rock, now it is to penetrate to desirable beds of ore. And from the earliest times down to and including our own, two difficulties have constantly presented themselves. The side walls of earth are continually on the point of caving in and thus defeating the object in hand, or water is pressing into the excavation and filling it up to a greater or less extent. And these two destructive tendencies exist not only in the situations referred to, but in many others, constantly occurring in engineering practice everywhere.

A simple method of retaining the soil is to drive down timbers side by side and then secure them by means of a horizontal piece braced on the front or tied back from behind. This is so obvious that we can hardly escape the conclusion that some such system of sheet-piling was used in very ancient times. Perhaps we may not claim for the sheet-pile the same hoar antiquity attaching to the bearing pile. At the same time, the necessity for its use must have, at times, been so urgent that its first invention must surely have approximated that of the other type. And, no doubt, some considerable success attended its primitive use—at least in connection with affording resistance to the horizontal thrust of the earth strata. With reference to sealing the water veins, we may well believe that success was only moderate. The modern engineer still has difficulty at this point.

However, the shutting off of water and preventing collapse of earth-walls are the two capital objects sought in the present-day application of sheet-piling. Sometimes the one object is in view, sometimes the other, sometimes both. If a bridge pier is to be constructed, a wall of sheet-piling is formed about the site of the foundation, sinking it to a suitable depth and making it approximately water-tight. The water may then be pumped out and the soil removed until a suitable stratum of hard soil or rock is reached, when the pier may be built up. It may of course be necessary to carry on pumping operations on account of leakage from below. Nevertheless, this is one of the leading methods of pier construction. A similar procedure is often applicable in laying pipe or performing other operations on a river bed. Thus, in the case of pipe-laying, a double line of sheeting may be run out from one bank to, say, the center of the stream. This is then closed by a connecting line of sheet piles. By pumping out the water and then excavating whatever soil is necessary to attain the depth required, the pipe may be laid halfway across. The piling may now be pulled and the remainder of the work completed. It will be noticed that the amount of piling required is determined by the necessities of one-half the job. The same methods are, of course, applicable to marshes and the like.

Its Use at Gatun.

In the building of dams, reservoirs and the like, it sometimes becomes necessary to prevent the seepage of water beneath the main works. Thus, if an earthen dam be contemplated, it may be found that bearing capacity can be found at a moderate depth sufficient to carry the weight, but permeable to water. The permeable strata may extend 20 or 30 feet and finally be underlaid by a thick stratum of thoroughly impermeable soil. To carry the main body of the dam down to the level of this water-tight stratum might be prohibitive for economical and other reasons, and recourse, in such situations, may often be had to sheet-piling. This is, of course, a permanent application. The piling must be practically exempt from corrosion or decay, and must be itself water-tight or capable of retaining water-tight material. Three methods, at least, are open to the engineer. If the piling is sufficiently water-tight or can be made so, then he may rely upon this means alone. This was the course at one time in mind for the great Gatun dam at Panama. This structure is to be a great mound of earth shod with rock on the upstream and downstream toes. With the exception of a natural hill in the center, this dam will be a great hydraulic fill a mile and a half long and, say, a fifth of a mile broad at the base and rising to a height of 115 feet above sea-level. It was thought previous to the visit of the late board of engineers that it would be necessary to construct a wall of steel sheet-piling to prevent seepage below the body of the dam. Some of this piling has been put in place, but the board decided that the precaution is, in general, unnecessary at Gatun. However, if a thin wall is necessary, sheet-piling seems a very suitable means of securing it. If the piling will be constantly wet, especially from water containing no free oxygen, then experience seems to warrant the expectation that neither wooden sheeting will decay nor steel piling corrode. However, the engineer may find that conditions require a heavier wall; he may then drive two lines of sheet-piles at the distance of eight or ten feet, or more, from each other, excavate the material lying between and fill the space with puddled clay, or he may drive the two lines as close as possible, having in view the excavation of the intervening soil. The space may then be filled in with concrete. This method is, perhaps, to be preferred to that with clay as a substantial wall of concrete once in place will depend but little upon the steel or wooden sheeting for its integrity.

An Instance of Utility.

The use of sheet piling is capable of very wide application, and this use is now extending with the advent of the sheet-piles made of steel of which recent years have witnessed the development. To give an example of a possible use to which, apparently, but little attention has heretofore been given, it may be mentioned that the steel sheet-pile seems to provide an admirable means for the construction of water reservoirs in cases where certain conditions are present. Thus, if the reservoir site be the top of a hill, the steel sheeting may be driven all around to form the wall of the proposed reservoir. The inclosed material will then be excavated to the desired depth. If the bottom is found to be a sufficiently thick bed of impermeable material, no other need be provided. If not, then the

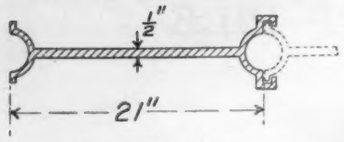


Fig. 1.

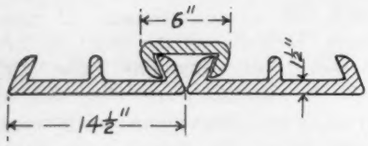


Fig. 2.

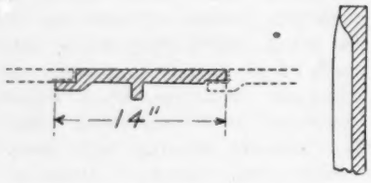


Fig. 3.

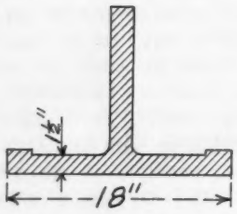
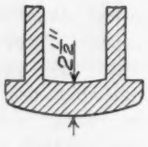
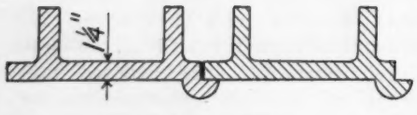


Fig. 4.



Main Pile
Fig. 5.



Sheet Pile
Fig. 6.

excavation may be carried further and an artificial layer of clay be put in place, covering the bottom on the inside and sealing the bottom joint on the outside. The wall of piling is next tied back in position. By constructing a thin protective wall of concrete, forming a facing for the piling, carrying it up over the summit and down on the outside below the corrosion point, the reservoir is practically completed. However, the wall of steel and concrete should not be relied on for anything more than the prevention of seepage. The pressure of the contained water should, if the reservoir be a permanent work, be entirely borne by the surrounding wall of eath.

We may sum up the uses of sheet piling by saying that they are two:

(1) A means of withstanding horizontal pressure whether from water or earthen strata; and

(2) A means of preventing the seepage of water and the like.

For these applications, the wooden sheet pile in one form or another has long been in use. The cast iron sheet pile was next invented in England, and came rather rapidly into favor. A recent example of the employment of this type of pile is in the Assiut barrage in Egypt. But the steel sheet pile is so rapidly forcing its way to the fore that wooden piling will soon be used only where some peculiar economic conditions obtain. The cast iron type should, it would seem, be already a thing of the past. However, the history of this variety of sheeting is of very considerable interest, as it marks the introduction of metal piling for permanent construction.

Early British Cast Iron Sheet Piles.

Perhaps the very earliest use of cast iron sheet piles is to be associated with the name of Mathews, who employed them in the construction of the foundation for the north pier of the harbor of Bridlington, on the east coast of England. This was before 1822. In form, these piles varied. The cross section view in Fig. 1 represents one style used. The length of the Bridlington piles, as we are informed in an old memoir by M. A. Borthwick, was about 8 or 9 feet with a width of 21 to 24 inches. The thickness was ½ inch.

In 1822, Ewart patented in England a system of constructing cofferdams in which he employs cast iron sheet piles. These piles were used in actual construction and a typical form may be understood from Fig. 2. It will be noticed that, unlike the Mathews pile, the piles do not interlock with each other. The connection is effected by a special piece. This style of sheet pile was employed by various engineers. Thus Mylne made use of it in a large cofferdam formed in the Thames river for the purpose of putting in a suction pipe. At Liverpool, Hartley used it for various purposes—among others, in the construction of the foundation for the river wall on the south. This engineer appears to have been much pleased with the Ewart piles. He speaks of the necessity, however, of using heavy balks of timber between which to drive the piles for the purpose of maintaining alignment. Further, he calls attention to the desirability of keeping the direction of fall of the ram in line with the pile in order to strike it fairly and avoid shattering it. It is quite possible that his experience of difficulty in keeping the piles vertical while driving was due to the unsymmetrical form of the section. The face of the pile is certainly very much heavier than the back. This we should expect to give rise to a tendency to lean forward. In cofferdam work under Mylne, the practice was to arrange all piles and connecting pieces in their proper positions and drive a short distance. The pile driver then passed round and round the circuit, effecting only a slight penetration upon a single trip.

First Permanent Construction.

Perhaps the very first application of metal sheet-piling to permanent construction occurred in 1824. A portion of a quay wall had been undermined by aqueous action, and in rebuilding it was determined to employ the Ewart pile. It was really used at first, but as the work went on it seemed desirable to modify the section. This was done, the modification amounting really to a new form. This will be understood by referring to Fig. 3. It will be seen that the separate piece to effect the connection is dispensed with and a self-interlocking form is adopted. However, the lock is effective on one side only, which was, no doubt, all that was required for the work in hand. The flange and reinforcing rib were placed outside. It seems that the change in form was due to the difficulty experienced in maintaining the alignment when driving them to the depth necessary in this case. These piles were 14 feet long, penetrated hard material, and when in

place projected but little above the surface of the ground.

A very extensive piece of work was carried out by Cubitt on the east coast of England in which 2,000 lineal feet of cast iron sheet-piling were used in wharf construction—permanent work. These piles were 30 feet in length and weighed about 1½ tons each. It will be seen upon examination of the view of a central cross-section shown in Fig. 4, that this is not an interlocking pile at all. In fact, the system was to secure the piles by a cross piece at the top. In order to present a suitable surface for the ram of the pile-driver, the top of the pile was made solid, the rear flange having been tapered in towards the web to a depth of about six inches. Near the bottom of the pile, this flange was reduced in depth down to almost nothing by a step-like construction. It is important to note the experience which led to this form of reduction. It was found, in fact, that the ordinary taper had the effect of thrusting the pile forward during driving, whereas the stepped form produced no such effect. The rams used were of about the same weight as the piles. It will be observed that adjoining surfaces of a series of such piles are very narrow, and consequently the driving would have to be performed in a most precise manner. To secure this precision, the expedient was adopted of riveting a couple of projecting pieces of wrought iron at the bottom of the pile to be driven. These, enveloping the edge of the adjoining pile, would act as a guide. This work was completed in 1832.

Wharf Construction.

About this same time, another extensive application of cast iron sheet-piling to permanent work was made in constructing a large wharf at Blackwall, London, at a point of the river Thames later known as Brunswick wharf. Two forms of pile were used. At intervals of 7 feet along the line, heavy iron main-piles were sunk. These performed the same office as the posts of fences. Between them, the space was filled in with the sheet-piling proper. The form of the main-pile actually adopted may be understood from the cross section shown in Fig. 5. These were cast in two sections, the upper length fitting into a socket in the lower. The section of the sheet pile used except when closing up the final interval is given in Fig. 6. It will be observed that locking is provided on one side only. As a concrete backing is used, this will readily be understood. In filling up the final spaces, a form was used in which the overlap was dispensed with, both edges of the pile being alike. The sheet-piles were driven in forming a wall closing up the intervals between the main piles, but not rising to the tops of the lower sections of these. In fact, from the tops of the sheet-piles to the summit of the whole structure, three large flat plates were inserted, each extending from main pile to main pile. Counting both main piles and sheet piles, about 600 in all were used in this work. Only 16 piles broke during driving. The sheet-piles were from 1 to 1¼ inches thick. The average weight was about 1,700 pounds. The rams weighed from 1,300 to 1,500 pounds each and the drop was 3½ feet or less. The driving is said to have been quite hard. The cost of this piling is understood to have been about $35 per ton delivered on the Thames.

A point of importance to be noted in connection with the introduction of the cast iron sheet-pile which we have been recording is the fact of its prompt application to permanent construction. While perhaps not the first inventor of this pile Ewart appears to have been the first patentee, but not to have had in mind permanent work. What he had before him was cofferdam construction. While cast iron has no doubt been relegated to the background once for all in favor of steel, still the experience gained in the early days, when steel was still a precious metal, that the metal pile could be used both temporarily and permanently, has not needed

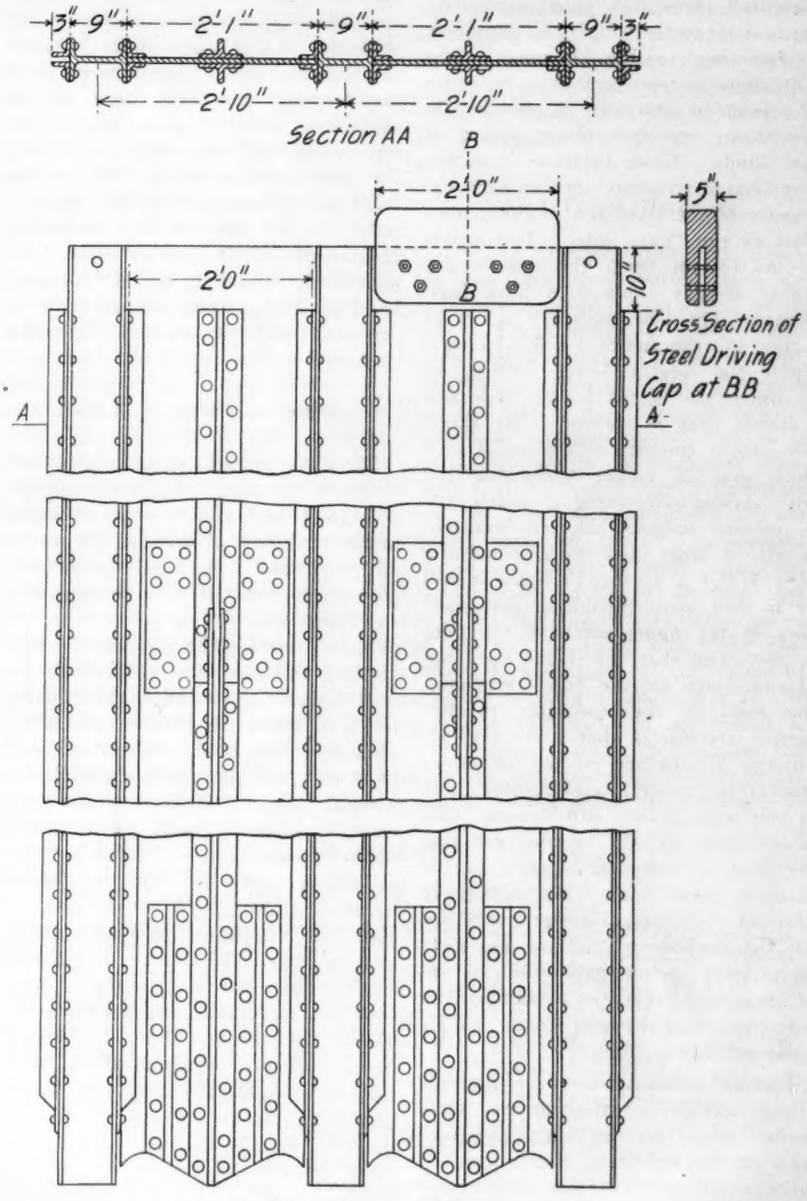


FIG. 7—PILING USED AT HODBARROW MINES.

revision with the substitution of steel for cast iron.

Some Recent Foreign Practice.

An important example of a foreign system of sheet piling is supplied in the extensive work involved in the construction of the outer barrier of the Hodbarrow Iron Mines. The ore body is located at the extremity of the peninsula which forms the southern extension of the County of Cumberland, England. An extensive barrier has been necessary to permit its development seaward. Inasmuch as there is an inner seawall, this is called the outer barrier. A great deal of wooden piling has been used there. But as no less than 4,416 tons of steel sheet-piling have also been used in this mile-and-a-quarter barrier, it may well serve as a good instance of the use of this material in England. A reference to Fig. 7, upper view, will show a cross-section of a series of assembled members. It will be observed at once that the piles are of two kinds. First, there is a rather complicated structure seen at each extremity of the view and in the center. This is the "gage pile." It consists of an I-beam upon the exterior of whose flanges angle bars have been riveted. The I-beams are 9 x 7 x ¾ inches and the angles 3 x 3 x ½ inch. Upon the angles being riveted, as shown, a slot about 1 inch wide and 3 inches deep is formed. The sheet-pile proper consists of a plate ¾ inch thick and 25 inches wide, together with various reinforcing arrangements. A central longitudinal reinforcement is placed front and back, consisting of a 5 x 3 x ½ inch T-bar. It will be noticed upon consulting the lower view in the figure, showing the piles in elevation, that the T-bar does not extend quite to the top. However, the foot of the sheet-pile is still further reinforced, that it so say, additional T-bars are riveted to either side of the central reinforcement, and in this way, a very stiff driving point is obtained. It will be observed that the foot is not left square, but is given a point flanked by a kind of horn at each edge. These horns are for the purpose of clearing the slots or grooves of the gage pile. A set of gage and sheet-piles were driven for test purposes and found to be quite satisfactory.

For the actual work of driving this piling, elaborate preparations were made. Along the line where the piles were to be driven a double row of wooden piles were driven at intervals of 10 feet and leaving a space between the two rows of 32 inches and exactly along the center of this space the steel sheeting was to be driven. There were certain other additional wooden piles, the whole serving as a support for the pile-driving engines and as a means of placing the steel piles. Horizontal timbers, 1 foot thick, were fixed to the inner side of the two rows of timber piles, so as to reduce the channel determined by these piles to a width of 8 inches.[1] and distance blocks were secured to these horizontals for the purpose of spacing the gage piles. As these piles were 15 inches wide (3 + 9 + 3 inches), that space was allowed between blocks and the blocks themselves were of sufficient width to allow a space of 25⅛ inches from flange to flange of the gage piles and as the sheet-pile was 25 inches, there was thus a clearance allowance of ⅛ inch. Iron plates were secured to these blocks to protect them, during driving, from the edges of the angle-bars on the gage piles. The ram, dolly and cap used for driving the gage piles weighed 3,000 pounds, 2,200 pounds and 325 pounds, respectively. In the case of the sheet-piles, the corresponding weights were 3,000 pounds, 1,950 pounds and 475 pounds. In Fig. 7 the form of the driving cap used with the sheet-pile may be seen.

Insecure Form of Lock.

Some of the ground through which the thin sheeting had to be driven was quite hard and in order to assist in the operation of driving, the water-jet was used. A T-joint was employed to separate the supply into two jets—one for the front of the pile, and one for the rear; at the nozzle end the pipe was reduced to ¾-inch diameter. The application of the jet was found to be very effective. However, the final penetration of 7 or 8 feet was ordinarily accomplished without it. At times, obstructions were encountered such as to forbid further penetration. In such cases a caisson would be sunk to remove it, or it might indeed be necessary to sink two caissons, one to the front and the other to the rear of the pile, and in fact, two steel caissons were kept in readiness for such work. These were 6 feet long by 5 feet broad and were constructed in 3-foot sections. These were flanged by means of angle-bars and could thus be bolted together.

The gage piles would first be driven, then the sheet-piles proper. In order that this method should prove successful, it was necessary that the spacing of the gage piles should be accomplished with very considerable precision. A total length of 4,636 lineal feet of steel piling of the style described was put down—the lengths varying from 25½ to 34½ feet. To one acquainted with certain German and American types of interlocking sheet-piling, the insecurity of the mechanical lock adopted at the Hodbarrow mines is striking. Thus an examination of the Jackson[2] system of heavy piling, where two channel-bars are used in connection with an I-beam to form the lock, will make manifest at once the superiority of this style. In the English pile a lateral withdrawal of the sheeting proper from the gage pile is possible. With the Jackson type this is not the case. Thus is solved, at one stroke, the question of original driving and subsequent maintenance *in statu quo*. Probably no one knows whether at the Hodbarrow barrier many joints have drawn apart or not. This seems to be a phase of the subject not well understood by British engineers. Thus, not only do we find this defect in the system used at the Hodbarrow mines, but likewise in the design of the sheeting used in the Assiut barrage in Egypt and in the Tredegar dry dock at Newport, England. In no one of these three cases, is the lock anything more than a tongue and groove.

Substituted for Wood.

Recent English practice has afforded examples of the use of all three of the general types of sheet-piles. Thus in the outer barrier of the Hodbarrow mines, both wooden and steel sheetings were used, while at the Assiut barrage cast iron piles were employed. The steel piling devised for the construction at the Hodbarrow mines has been dealt with already. On this last work, a considerable quantity of wooden sheeting was used—in fact, about 800 lineal feet. While it is not clear that the opinion of the engineers in charge of this work is in favor of steel sheeting as a substitute under all circumstances for wooden sheeting, still it is worthy of note that during construction the substitution of steel for wood was actually made at one point. The underlying soil had become so hard that

[1] In the discussion of the paper on the Hodbarrow Mines in the Institution of Civil Engineers, it was stated that but one line of waling was used. I have followed the account given in the text proper.

[2] This piling seems to have been originally invented in Germany.

repeated efforts to drive the wooden piling were unsuccessful. In seeking to get these piles out, some broke off, others left their shoes behind and disclosed at the foot a condition of having been "burred" in fiber. Consequently, it was determined to substitute steel sheet-piles for a stretch of about 500 lineal feet where it had been intended to use wood. Further, it had been proposed to use the trench filled with puddled clay as a cut-off on three distinct sections of the barrier —at either end and in the center. The clay cut-off was entirely abandoned throughout the central section and steel sheeting substituted. At one of the end sections another substitution of steel sheet-piles was made. The two substitutions thus made amounted to about 2,400 lineal feet. Altogether, steel sheet-piles had actually replaced other intended methods of forming a cut-off for a linear amount of about 2,900 feet when the work was finished. Of a total frontage of 1.30 miles, steel sheeting forms the cut-off for nearly 0.90 mile. It had originally been proposed to use it for but 0.32 mile. It is instructive to understand the reasons for the substitution. We have already dealt with one of these—difficult soil. The substitution for the trench of puddled clay seems to have been due largely to the irregularities in level of the underlying clay stratum into which it was desired to key the clay cut-off. It is illuminating to understand that steel sheeting is equal to both emergencies.

American Practice.

The cast iron sheet pile seems never to have come into any great favor in the United States. However, American engineers had to use some description of piling. So, with cast iron aside and steel sheeting not yet developed, recourse was had to the wooden type. Perhaps the most striking style is that invented and patented by Wakefield in the latter part of the preceding century. It is typical of American simplicity. Each pile is formed of three identical planks. Thus, suppose these planks to be 3 x 12 inches. These are laid one upon another, the central one being laterally displaced throughout its whole length for one-half its width. A cross-section of the result is shown in Fig. 8. Bolts at each end and at a midlength secure these planks together. They may be reinforced by 6-inch spikes driven at intervals from each side of the pile. There results a strong sheet pile having a large tongue and corresponding groove. It is 9 inches thick and has a 12-inch face. The waste and labor

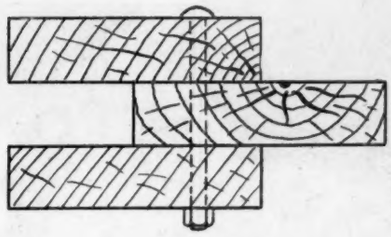


Fig. 8.

WAKEFIELD WOOD PILING.

entailed by constructing this or an equivalent form out of one piece are evident, to say nothing of the expense of using timbers 9 x 18 inches. This form of piling was in successful use as far back as a score of years ago.

But no form of wooden sheet-pile can be expected to perform the service possible with a properly formed sheeting constructed of steel. The requirements imposed on a sheet-pile are too nearly those met by structural steel shapes to cause much doubt on this head, when once the matter is considered. In the construction of buildings and bridges, wood has been continually relegated to the rear, indeed, structures are today possible with steel that would have been out of the question with wood and we may expect similar results with the steel sheet-pile. Steel has such wonderful strength that the extraordinary expansion of its use in modern times is simply due to the fact that the manufacture of the raw material and the fabrication of it into the fundamental forms have become cheap processes. Men would have used steel, no doubt, centuries ago in many of its present applications if they had known how to make and form it in large quantities with a reasonable expenditure of labor and time. Now, just as the general introduction of structural shapes waited for the rolling mill and the Bessemer and other cheap processes for the manufacture of the raw material, so it has been with the steel sheet-pile. It was needed and sorely needed. Cast iron was unable to meet adequately the requirements of bridge and building construction. It did not possess the strength and it could never have fully performed the duties properly belonging to the sheet-pile. Thus, with the hard driving at Hodbarrow mines, it is not too much to say, that cast iron sheeting would have been out of the question. It succeeded in the Assiut barrage. But there the lengths were ordinarily of but 16 feet and the driving was through river silt. The substitution of steel for cast iron has been merely a question of economics. However, the economic possibility turned not only on the cost of the material itself, but on the expense of manufacture, and as there have been developed hardly any large uses of steel that do not depend upon the rolling mill, so it is with the steel sheet-pile. Apart from the rolling mills, it is practically an impossibility; with the rolling mill, the conquest of the sheet-piling field by the steel type is certain.

Rolled Forms Necessary.

Now the development of steel sheeting has taken two courses; both dependent, however, upon the rolling mill. First, sheet-pile forms made from standard shapes. There are two immense advantages possessed by piles of this type. The material can be bought in the open market, and so is readily obtained at a reasonable price. Second, if the use is only a temporary one, the piles when withdrawn are not merely pieces of scrap. The standard shapes are salable as such. However, invention has followed another path as well, resulting in the development of the specially rolled pile. The fundamental advantage which must be assigned to these forms, unless in any particular case evidence in rebuttal is forthcoming, is that the pile can be made to conform more closely to the special requirements of sheeting; in

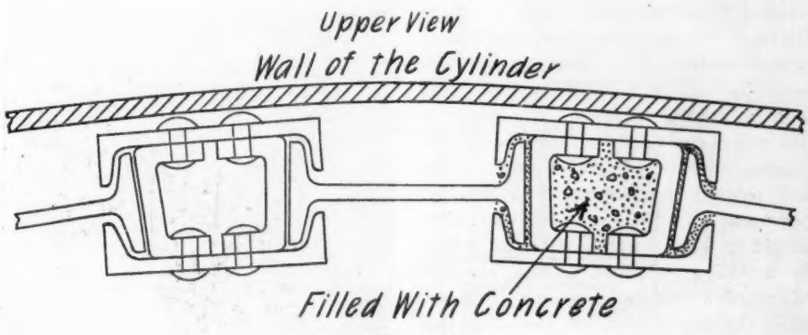


Fig. 9.

THE SIMON STEEL PILE.

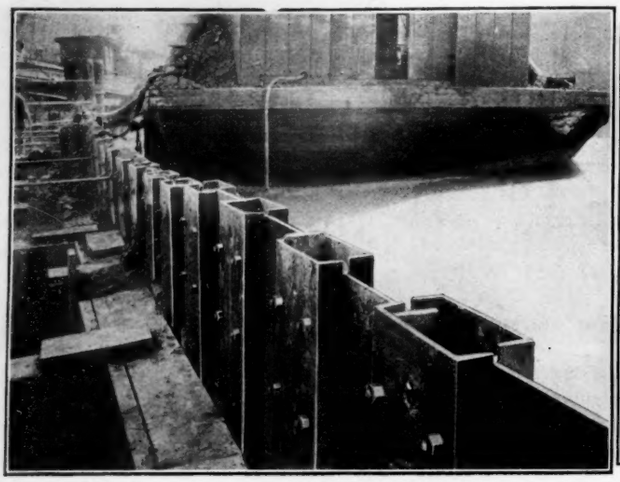


FIG. 10—JACKSON PILING, COFFERDAM RANDOLPH STREET BRIDGE.

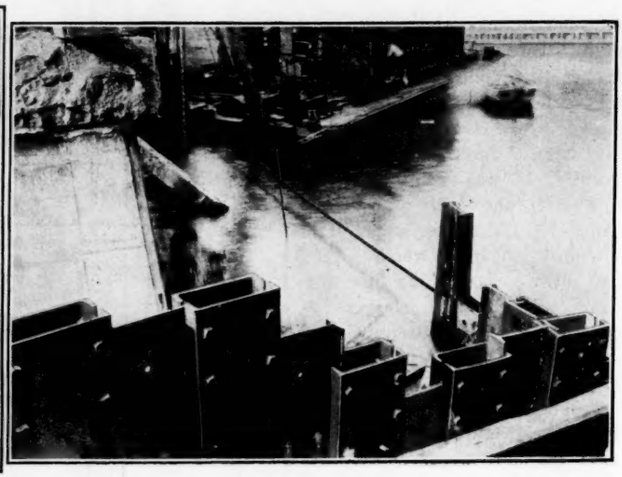


FIG. 12—JACKSON PILING, COFFERDAM KINZIE STREET BRIDGE.

other words, the designer is freed from the limitations of the standard shapes and can devote himself entirely to meeting the engineering demands. However, the rolling mill itself imposes limitations, and these, as we shall see, may threaten the very life of the design.

German Experience.

Among the most noteworthy of the American built-up forms is the heavy type of piling manufactured by George W. Jackson, Inc., Chicago. This is fundamentally a German invention due to August Simon and patented in Germany in 1891, in Belgium in 1892, and in the United States in 1893. Its inception seems to have been due to the engineering exigencies arising during the sinking of a shaft at the New Hope coal mine in the Magdeburg district, Germany. There was first a stratum of water-bearing gravel 39 feet thick, below this a layer of blue clay about 49 feet thick and finally a body of quicksand extending to a depth of 34 feet, and through this series of strata, 122 feet thick in all, the shaft had to be sunk. The formidable question here was not the restraint of the walls, but the sealing against water. The first attempt was made by sinking a masonry tube shod with a cutting edge at its foot, but this structure tilted before the water-bearing stratum of gravel was cleared and refused to penetrate into the impervious clay below. It was then sought to keep out the water by means of a lining of timber, and the use of wooden construction was followed until the penetration of the clay was nearly complete. It will be readily understood that this lining would seriously encroach on the free space in the shaft. The Haas system of tube-piling was next employed in order to pass through the quicksand. In order to prevent the rise of the quicksand, a block of concrete 5 feet thick surmounted by a layer of gravel 6½ feet deep was placed in the bottom. But this effort proved unsuccessful, and the inrush of water became unbearable. Buildings about the mouth of the shaft began to settle and the upper ring of the masonry tube began to crack and admit water. The Haas tubes could not be prolonged upwards on account of the timber lining. If this had been possible, more gravel could have been deposited to assist in restraining the quicksand below. It will be understood from the foregoing that the situation was somewhat critical. But out of the necessities of the hour, Simon evolved his system of piling.

The form used in the present instance is shown in Fig. 9. There are two styles of section—a box form and a girder. The box form is constructed of two channels arranged with bosoms facing each other. The arrangement is such that the flange of an I-beam may be slipped inside at each end of the box with its web lying between the edges of the channels. The two channel-bars are kept in position by suitable separators firmly secured to them in the manner shown in the figure. A lining of this type was put in place little by little and the timbering removed in the same manner—the one lining thus replacing the other. The box was filled with cement mortar and the joint between the piling and the curb was likewise filled in with cement. More room was thus provided and a water-tight lining secured. Gravel was now deposited to resist the upward thrust of the quicksand, when the work of sinking Haas tubes could be continued.

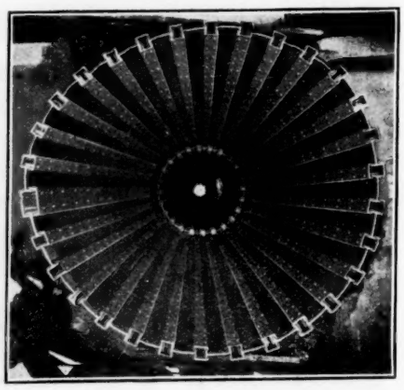


FIG. 11—SHAFT LINED WITH JACKSON PILING.

Work on Chicago River.

Some eight or ten years later, George W. Jackson found himself under the necessity of building a coffer-dam in rather deep water. This was in connection with the construction of the substructure for the Randolph street bridge, Chicago. At this point in the Chicago river, the tugs, in making the right-angled turn from the main stream into the south branch lose to a considerable extent control of the boats in tow because of the current. A coffer-dam at this point was thus exposed to damage from the drifting boats and it was thought that a wooden structure would scarcely have been equal to the emergency. Other considerations entered also, so that a different procedure seemed advisable. Up to this time, however, no steel sheet-piles had been driven in the United States, except for experimental purposes, but Mr. Jackson was confident of his ability to use them for this cofferdam. So, adopting the fundamental ideas contained in Simon's system, he constructed the box sections of 15-inch channel-bars, using

stud bolts and thimbles to bind them together. With these and the standard I-beam, he built the coffer-dam, shown in Fig. 10 and which on one side, abutted against an old flour mill. It is said that no settlement took place during construction and that the 200 employes were never disturbed. Another side of the coffer-dam was on the bank of the Chicago river where it was continually exposed to the impact of loaded boats. The sealing of the structure was effected by means of clay, and is said to have been quite successful, and further, it is said that no leaks were caused by the frequent jars from passing boats. If this had been a permanent construction, the sealing could have been accomplished with concrete or with cement mortar. This coffer-dam was 75 feet by 85 feet. The piles were 40 feet long and the water depth 25 feet.

(To be continued.)

THE VAUGHAN-HUGHES HEAT TREATMENT PROCESS FURNACES

It is well known that profound changes may be introduced into the internal structure of metals and alloys by simply causing them to pass through certain ranges of temperature at varying rates of change, without subjecting them to any form of mechanical force applied by machine or by hand. Alterations thus brought about by the effects of heating and cooling are termed the results of heat treatment. During recent years the heat-treatment of metals and alloys has received a considerable amount of attention from metallurgists. With regard to steel and other ferrous metals and alloys, the experiments of Brinell and others have conclusively proved that by simply raising the temperature of the material slowly (the rate of heating and cooling depending upon the hardening constituents present, and the mass of metal treated), and then quenching it in a liquid, solid or gas, followed by a reheating and by still another quenching, remarkable effects are produced in the mechanical properties of the heat-treated material. In the case of brasses, bronzes and sundry other non-ferrous metals and alloys, the published investigations of Thurston, Charpey, Shephard and others have demonstrated that great improvement in the quality of these metals can be brought about by heat treatment only. It is scarcely necessary to emphasize the important part that this treatment plays in modern engineering practice. Many large firms treat all steel before machining, and by so doing obtain an increased output and reduce breakage of tools to a minimum.

All the researches of pioneers and their disciples in this branch of metallurgy have been conducted upon unfinished or only partly finished material, such as bars, rods, sheets, etc. These, whilst demonstrating the possibility of such treatment, did little to demonstrate its practical, or at any rate commercial, value, as obviously the practical advantages of heat treatment were rendered abortive if means had not been devised for conducting the operation in such a manner as to prevent deformation or alteration in dimensions of the finished article after subjection to the process. To overcome this, recourse was had to enclosing the finished article in a closed vessel, heated and filled with powdered charcoal, fine dust and even with gases, or by filling up vacant spaces as much as possible with waste articles of the same material as these under treatment. The end in view was to displace the air as far as possible and then rely upon the further displacement of the residual by the evolution of occluded gases in the material, or released surface films of gaseous and organic matter in the closed receptacles, and that whilst the contents were being heated in the furnace. It is obvious that only in exceptional cases would the above procedure lend itself to rapid output, while when dealing with large turnovers in costly metals and alloys, the interest on capital outlay during the conduct of operations would be an item for consideration, so that any improvement or device which obviates the necessity of packing the finished articles in boxes is an important step in the direction of economy.

The Hughes Method.

To meet such a demand T. Vaughan Hughes, Birmingham, invented a process in 1899 and patented it in 1902. In his specification he described sundry methods of applying it to heat-treating operations so that they might be conducted continuously or intermittently as circumstances rendered expedient. During Hughes' researches some 10 years ago, he ascertained that in contradistinction to all existing methods, it is necessary, in order to obtain the best consistent results, that the articles to be heat-treated should be surrounded by gases, inert in respect to the metal or alloy dealt with at the temperature attained and, what is essential, kept in movement, so as to sweep out occluded gases and surface films evolved during the raising of the temperature in the heat-treatment process. Further, the reaction of the stream of inert gases, when properly composed, the inventor claims, removes some of the injurious constituents of the metals under treatment. Thus in steels the sulphur, phosphorus and nitrogen are removed in quantity dependent upon the time involved in the heat-treatment. Naturally the carbon content can, if necessary, be altered—all these without oxidizing or scaling the finished article.

It is claimed that similar results ac-

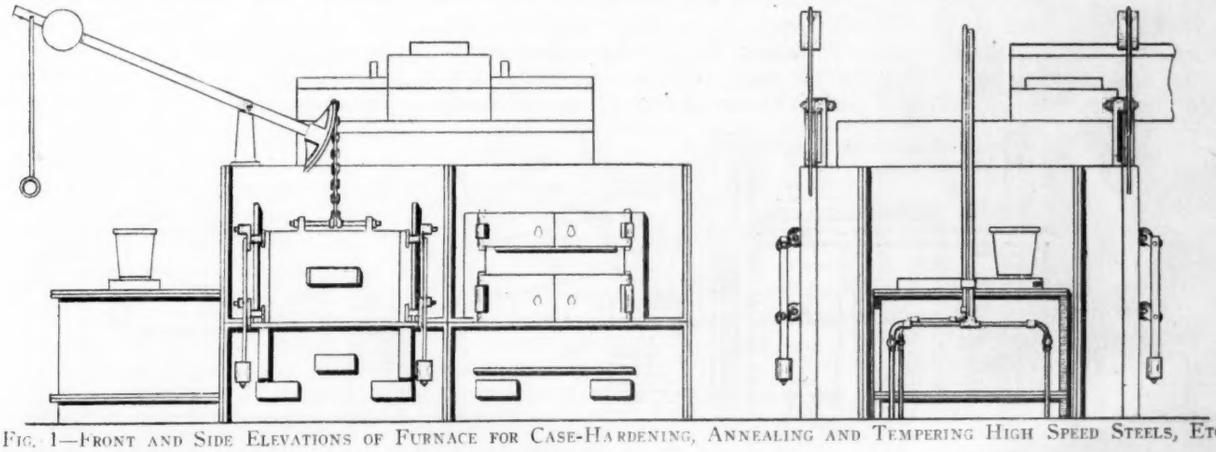


FIG. 1—FRONT AND SIDE ELEVATIONS OF FURNACE FOR CASE-HARDENING, ANNEALING AND TEMPERING HIGH SPEED STEELS, ETC.

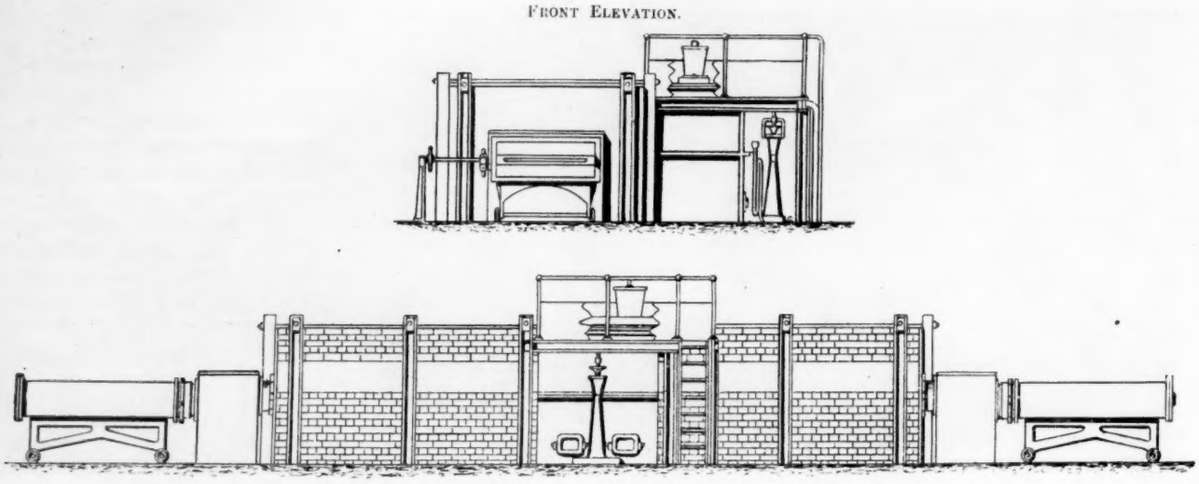


Fig. 2—Front and Side Elevations of Furnace for Continuous Annealing of Sheets.

crue in non-ferrous metals and alloys by applying the Hughes process, but of special interest is the removal of films of lubricant and vaporizable organic substances, which in all closed methods of heat-treatment result in stains upon the finish article. At first sight there would appear to be many methods of overcoming these difficulties. Thus, why not waterseal the entrance of the furnace and pass the articles to be treated through the water into the hot space and out through another water seal into the air? In the first place the heat-treatment of ferrous metals and alloys cannot be conducted in any furnaces having a water seal exposed to the hot atmosphere of the heat-treatment space or muffle. In the second place water seals are only permissible with a few non-ferrous metals and alloys, such as copper, pure and standard silver, nine carat and low alloys of gold, when applied to certain purposes. Brass of the better qualities is deteriorated by quenching, irrespective of other defects; it will therefore be understood that liquid seals are precluded from use in the heat-treatment of most metals and alloys.

The means adopted by Hughes for overcoming the difficulties described above and achieving the desired results are not without interest. The method of heating the treatment space is immaterial. Hughes in his first patent (1902) described both gas-firing and electric heating—a bath of fused salts heated by the passage of a current between electrodes or externally by any other source of heat. However, as the result of years of experience, he has now fallen back upon gas-firing mainly. He found the fused salts only suitable for small work in steel. Large pieces of finished work, being heated too rapidly, were liable to incipient cracks, and sometimes to complete fracture, whilst fused salts in a workshop constitute a serious nuisance. When heat-treatment and subsequent tempering at lower temperatures is desired the inventor recommends lead baths, and has designed such a bath for a manufacturing firm in the Midlands, which is in regular work, holding 7 tons of molten lead.

The very essential sweeping out process is obviously unattainable in a molten liquid; thus, all the Vaughan-Hughes furnaces for the preparatory heat-treatment of steels have the treatment spaces filled with moving hot gases. These in most of the furnaces dealing with finished work of large size are combustible, and after passing through the treatment space are burnt to supply the necessary heat. A heat-treatment should, of course, be independent of all other furnaces, and to this end the inventor decided to attach a gas producer to each furnace or block of furnaces—the division of the units being determined by the character and extent of the operations to be conducted in a block and the output and exigencies of the total furnace equipment. The gas producer has recently been re-designed to comply with the best practice and continuous working; it is grateless, and can be charged without materially altering the quality of the gas.

Control of Heating.

It will be gathered from the foregoing that the heat-treatment spaces in these furnaces are separated from the combustion chambers—or heat-giving devices. In his gas-fired furnace the inventor utilizes a "mixed" gas having little (if any) "crackable" hydro-carbons in its composition. He adopts well known means for controlling the hydrogen contents, thus relying on the other "permanent" gas which has been proved to yield the highest furnace efficiency. Not only is a high temperature of the heat-treatment or laboratory space more quickly attained, but what is of the utmost importance, it can be regulated at will, both as to rapidity and evenness with precision and ease. This evenness of heating, in

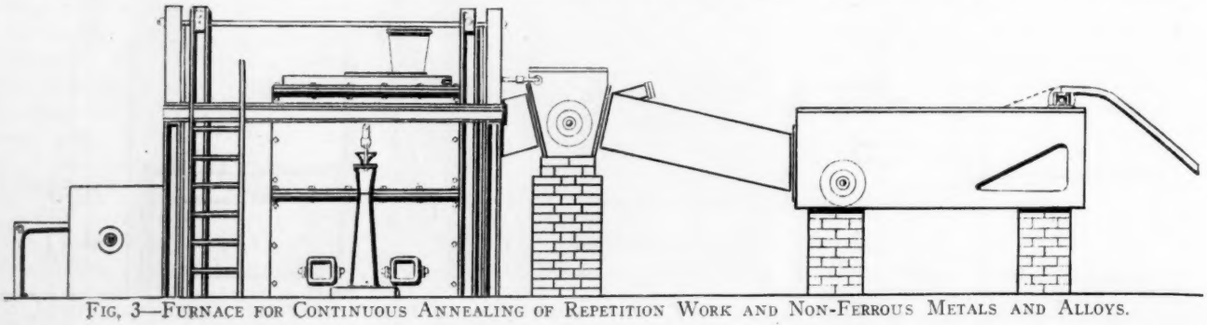


Fig. 3—Furnace for Continuous Annealing of Repetition Work and Non-Ferrous Metals and Alloys.

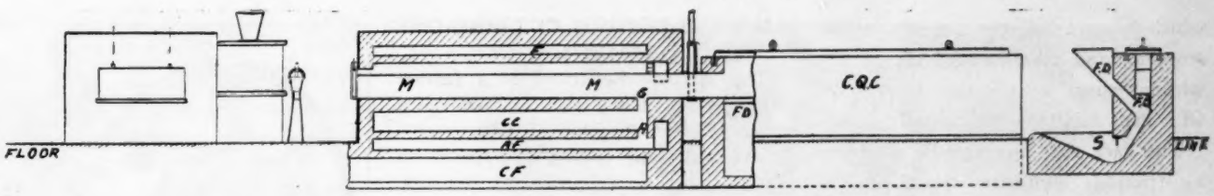


FIG. 4—DIAGRAMMATIC SKETCH OF FURNACE FOR ANNEALING LONG TOOL STEEL BARS.

the absence of tar and crackable gaseous hydro-carbons, is made possible by the principle of reversed flue construction. The limits of temperature are controlled by the amount of recuperation to which the air admitted for combustion is subjected, both main gas and air supply being under separate control by very simple devices. The character of the non-oxidizing gas in the laboratory space has already been alluded to.

Fig. 1 illustrates a furnace for case-hardening, normalizing, annealing and tempering motor car parts, etc., and similar work. This furnace has a clear heat-treatment space of 6 ft. long by 3 feet 4 inches wide by 2 feet 3 inches to the skewback of the muffle hearth.

Fig. 2 shows a furnace designed for annealing iron and steel sheets continuously, in manner similar to a printing machine. The hard-rolled (and bright) sheets are fed into the chamber at one end, the annealed and cold sheets pass out from the other. This furnace has a capacity of 60 to 80 tons of sheets per week.

Fig. 3 exhibits a furnace for continuous annealing repetition work, and certain non-ferrous metals and alloys, such as copper wire and stampings, cartridges, common brass stampings and pressings, standard silver and nine carat gold.

Fig. 4 represents in diagrammatic sketch a furnace for annealing tool-steel bars 12 feet to 16 feet long, in large batches of several tons at an operation. The charging is effected through the front door of the muffle M M. As these furnaces are worked *in plenum* (i. e., the gaseous pressure is slightly above atmospheric, reckoning from the inside outwards), a short translucent flame plays around the door. The bars are charged into a hot non-oxidizing gas moving against them towards the charging door. After attaining the proper temperature, which is shown by the recording pyrometer placed in the foreman's office, the bars are pushed by tools into the cooling chamber (C Q C), in which chamber they are enveloped in the flue dust or lime, fed in a continuous stream. The cooling of the bars through the transformation points is retarded as may be found practically necessary for the output. The charge is finally directed into the sump S, wherein the complete cooling takes place, whilst the furnace is being recharged with another batch of hard-rolled bars. Such in brief is the line of procedure adopted when dealing with light bars; certain when handling heavy material. The modifications are, of course, necessary rolling motion imparted to the bars when falling with the flue dust into the slump has the effect of straightening them and keeping them straight.

It now only remains to briefly describe the pit form of case-hardening, or annealing furnace for rendering castings malleable. This type of furnace is designed by Hughes upon the lines of the lead bath furnace. The only difference between them is that the hot annealing space is filled with a moving gaseous mixture, which accelerates the case-hardening process, prevents the scaling of the annealing pots, and helps to equalize the heat in the working space. The furnaces are constructed below floor level, which reduces the temperature of the annealing shop very materially. A jib or other form of crane is provided to serve the furnaces, which not only facilitates the handling of large work, but renders the operation of discharging them possible without cooling down beforehand.

Tests of Treated Material.

A somewhat comprehensive series of tests was recently made in the Vaughan-Hughes furnace upon finished articles of steel and wrought iron of well-known brands, designed to withstand a tensile strain of over 78,000 pounds. The mean of closely agreeing results after the final heat-treatment was as follows:

Steel containing		Rise in tensile strength of
Per Cent	Per Cent	Per Cent
Carbon 0.15	Manganese 0.5 gave	53.8
Carbon 0.20	Manganese 0.5 gave	62.3

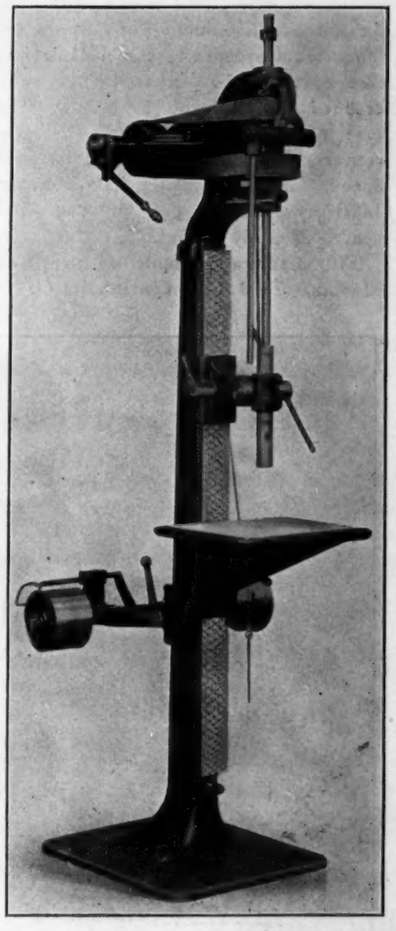
The elastic limit was also raised from 33,500 pounds to 45,000 pounds per square inch. In the wrought irons the rise in tensile strength varies from 12 to 16.5 per cent, according to the quality of the iron.

We are indebted to the *Iron and Coal Trades Review* for the foregoing description and illustrations.

FIFTEEN-INCH DRILLING AND TAPPING MACHINE.

This machine has been designed to meet the demand for a tool that would handle light drilling and tapping expediently.

The drill combines strength, ease and rapidity of manipulation, with accuracy and uniformity of work produced. It embodies the regular features of a modern, sensitive drill press, and in addition provides six spindle speeds to the spindle. These six spindle speeds are obtained by shifting a clutch on the back shaft, which rotates the large and small spindle pulleys in either direction, and through the three-step cones, as shown. The spindle is driven by two friction pulleys, of different diameters,



KERN 15-INCH DRILLING AND TAPPING MACHINE.

which permit of the rapid starting, stopping and reversing of the spindle without shock or jar, and is provided with ball bearings for spindle thrust.

The fact that the spindle is driven by frictions eliminates the danger of breaking taps, as the friction can slip before the breaking point of the drill or tap is reached. The spindle pulleys are driven by a continuous belt, which gives a powerful and steady drive. The frictions are self-adjusting, allowing any tension desired by the operator to be applied. The spindle is counterbalanced, and is provided with an adjustable lever for the rapid approach and return of the drill. The table is of the square oil-grooved type, is amply large, and is provided with a cup center and V-block. Both the head and table are adjustable vertically on the column of the machine.

One endless belt, especially made, is furnished with each machine, for the upper friction pulleys. A positive screw is provided to adjust the pulley shaft frame, to increase or lessen the tension of this belt. The principal particulars are: Total height with spindle extended, 99 inches; maximum distance from spindle to table, 41 inches; size of table, 12½ x 14 inches; traverse of sliding head, 15 inches; traverse of spindle, 5½ inches; drills to center of 15-inch circle; spindle speeds, 260, 340, 420, 480, 550 and 1,000 revolutions per minute; floor space, 28 x 34 inches.

The machine is built by the Kern Machine Tool Co., Cincinnati, O.

AN ABLE-BODIED CUTTING-OFF MACHINE.

The machine illustrated is a further development of the idea first embodied in the Gorton machine of 1905.

Essentially the cutting apparatus in this design is a second-order lever which, by providing the maximum of support, makes possible the application of great power without distortion and consequent vibration. Applied to the cutting off of bar material by a rotary cutter this involves passing the work *through* the cutter, which takes the form of a disc of relatively large diameter with a central opening about which the cutting teeth or tools are either formed or secured and the provision of means for either feeding the work across the disc or vice versa.

A gear of large diameter, with an elongated hub running in suitable bearings and with an internal diameter sufficient to take the stock and allow of a transverse feed at least equal to the greatest diameter of work fulfills these conditions and constitutes the central feature about which the machine shown in Fig. 1 is built. In this design the work is clamped rigidly upon a stationary bed and the entire head carrying the gear, with drive, is fed across the bed.

Fig. 2 shows the drum gear dismounted and shows clearly the construction of the cutter disc and method of securing to hub, by means of dowels and screws.

This machine has a capacity for bars up to 6 inches, which it will cut off in less than one minute, though the makers say that no tool steels yet available will maintain this rate; the machine, therefore, is somewhat in advance of steel development. The speeds are calculated for 76 feet per minute at the cutter teeth and the feeds have seven changes for 13 inches to 6 inches per minute. A geared pump delivers lubricant to the cutter teeth. The machine is designed upon absolutely sound principles and should be capable of rendering the constant hard service for which its makers say it was designed.

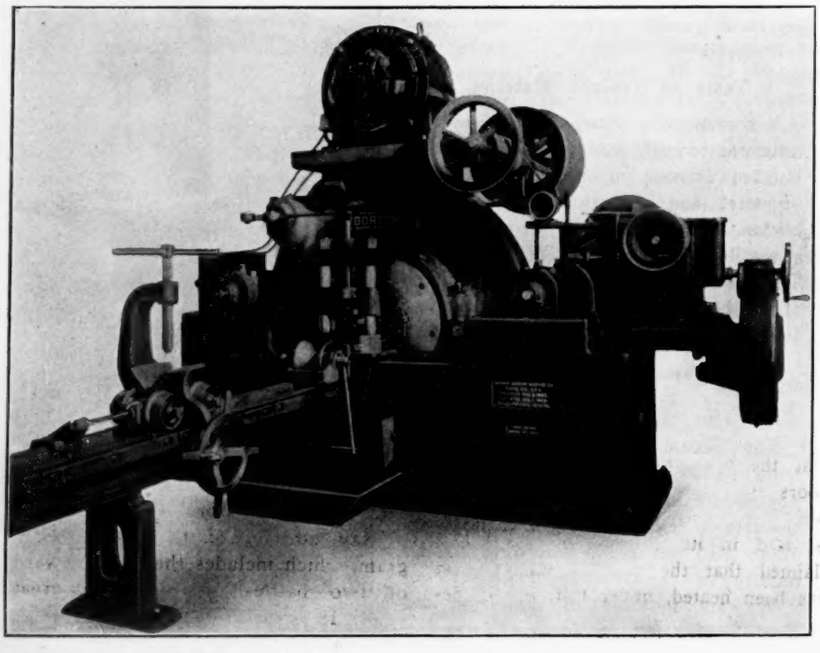


FIG. 1—GORTON CUTTING-OFF MACHINE.

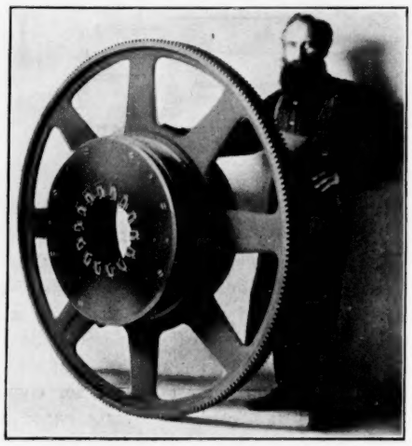


FIG. 2—GEAR AND CUTTER.

Exhaustive capacity tests made on one of these machines show some remarkable results, as evidenced by one of the reports which is reproduced herewith.

The following tests were made without any mishaps, not even the breaking of a cutter, and on completion all cutters were in the best possible condition:

Diameter of bars cut.	Revolutions per minute of cutter.	Cutting speed of cutters, feet.	Machine time cutting off each piece, seconds.	Condition of cutters.	Advance of cut per minute.
4 inch round.....	35	91	60	Good	4
4 inch round.....	35	91	60	Good	4
4 inch round.....	35	91	60	Good	4
4 inch round.....	35	91	40		
4 inch round.....	35	91	40	Good	5⅝
4 inch round.....	35	91	40	Good	5⅝
4 inch round.....	35	91	35	Good	6½
4 inch round.....	35	91	35	Good	6½
6 inch round.....	35	91	94	Good	4
6 inch round.....	35	91	80	Good	5
6 inch round.....	35	91	68	Belt slips	5⅝
6 inch round.....	35	91	66	Belt slips	6½
6 inch round.....	35	91	64	Belt slips	6½
6 inch round.....	35	91	64	Belt slips	6½
6 inch round.....	35	91	..	Was dark before belt was fixed.	

The machine is built by the Geo. Gorton Machine Tool Co., Racine, Wis.

Consul L. J. Keena, of Chihuahua, Mexico, reports that the governor of the state of Chihuahua has granted a 10-year concession for the building of a metallurgical works at Parral, Chihuahua, with a minimum capacity of 30 tons daily, the plant to be completed within 18 months.

AMERICAN SOCIETY FOR TESTING MATERIALS.

Circular No. 44, issued by the secretary of the above society, contains the results of the balloting on the specifications submitted at the recent meeting at Atlantic City, which are abstracted as follows:

Resolution in Circular No. 43, favoring the construction of a large testing machine, or machines, 94 for, 2 against, 9 not voting.

The proposed revised specifications for steel for ships, 71 for, 3 against, 31 not voting.

The proposed revised specifications for steel for tires, 68 for, 3 against, 34 not voting.

The proposed revised specifications for steel for buildings, 76 for, 1 against, 28 not voting.

The proposed revised specifications for steel for Bessemer rails, 68 for, 6 against, 31 not voting.

The proposed revised specifications for steel for open hearth boiler plate and rivet steel, 69 for, 5 against, 31 not voting.

The proposed amendment of the specifications for steel for bridges, 72 for, none against, 33 not voting.

The proposed amendments of the specifications for steel splice-bars, 71 for, 2 against, 32 not voting.

The proposed specifications for open hearth steel rails, 65 for, 8 against, 32 not voting.

The proposed specifications for foundry pig iron, 70 for, 2 against, 33 not voting.

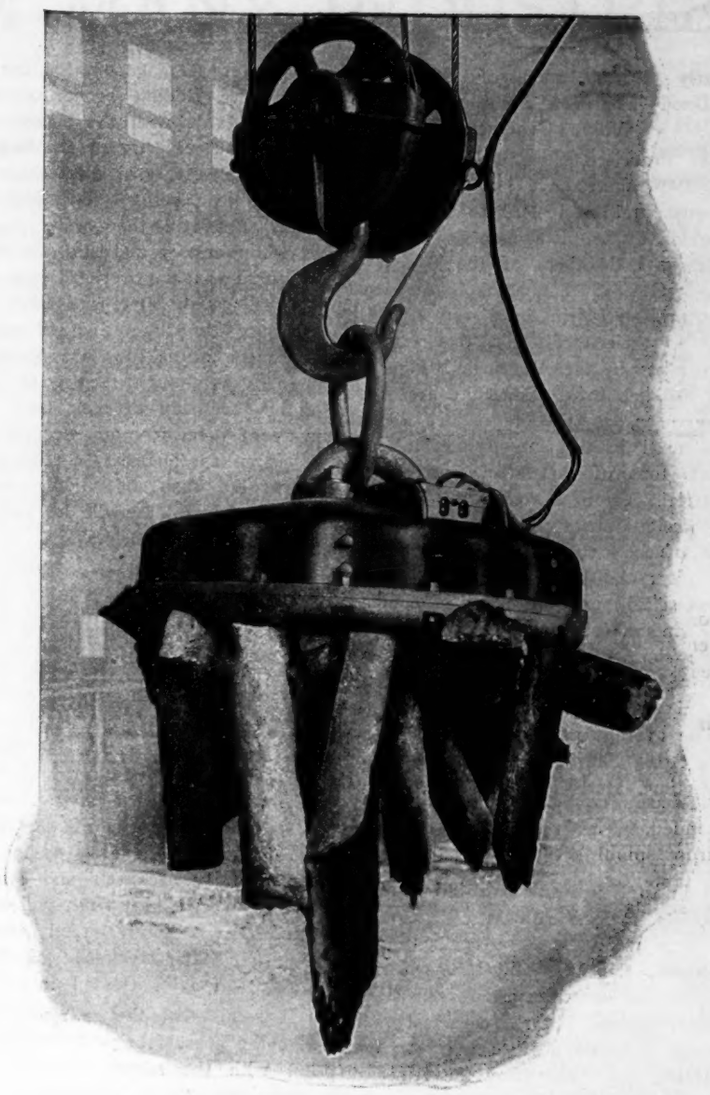
Notice is also given that the executive committee has authorized the creation of the following new technical committees:

1. On Standard Tests of Insulating Materials.
2. On Alloy Steel.
3. On Non-Ferrous Metals and Alloys.
4. On Explosives.
5. On Standard Samples.
6. On Standard Specifications for Wrought Iron.

NEW CUTLER-HAMMER LIFTING MAGNET.

A new lifting magnet has recently been developed by the Cutler-Hammer Clutch Co., of Milwaukee, which, it is claimed, will make the installation of this modern labor-saving device profitable to many small plants that have hitherto been deterred from purchasing a lifting magnet.

The 50-inch magnet, which is the size usually employed by the larger industrial plants for handling pig iron, scrap, etc., is oftentimes too heavy and generally too expensive for smaller establishments. The new magnet meets these objections by cutting both the weight and first cost practically in half, while at the same time the lifting capacity is only about 500 pounds less than that of the larger magnet.



CUTLER-HAMMER LIFTING MAGNET.

The new magnet is designed especially for use with locomotive cranes, but may be used on overhead cranes as well. In the first case it is usually supplied with a yoke and single link suspension requiring only 27 inches headroom, while for use on overhead traveling cranes or gantrys the familiar chain tripod form of suspension commonly used with larger magnets is employed.

In the design of the new magnet careful attention has been paid to the important question of heat radiation, to the anchoring of the coil and to securing absolutely water-tight joints, so that the magnet can be used out of doors in all weathers without damage. No combustible material of any kind is used in its construction and it is claimed that the coil of this magnet has been heated, under test, to 470 degrees Fahr., without detrimental effects.

Figures furnished the manufacturers by steel mills where these magnets are in use show that they are capable of unloading pig iron from gondola cars at the rate of 100 tons per hour at a cost of ½ cent per ton as against 5 to 8 cents per ton for manual labor.

A full description of the various types of lifting magnets manufactured by the Cutler-Hammer Clutch Co. is given in a 48-page booklet recently issued by this company.

Shipbuilding conditions are extremely active both on the Atlantic coast and on the great lakes. The coast shipyards have 25 merchant vessels under way for coastwise trade, to say nothing of their naval program, which includes the recent award of two battleships. On the great lakes, 18 vessels are under order for 1910 delivery.

REBUILDING FRISCO.

Nearly 100,000 tons of Structurals Used—The New Bidding on the Valve Contract.

San Francisco, Sept. 27.—Since October, 1908, there have been 97,538 tons of structural steel used in the reconstruction of San Francisco for Class A buildings and others of the B and C class. Out of that amount, the local structural steel firms have secured 81,418 tons to their credit and the rest has been taken by the American Bridge Co. and Milliken Bros. Since the fire, there have been, in the aggregate, 284,715 tons used in this city for rebuilding; 34,000 tons of that steel was foreign material. Up to a year ago last April, the eastern firms were taking 75 per cent of the structural steel jobs out of the city; the local firms were getting between 20 per cent and 25 per cent. The amount paid out for structural steel alone since the fire, out of a total of over $200,000,000 spent for rebuilding the city, was $19,342,432.00.

The average price paid for steel before April, 1908, was $73.00 a ton. Since that time, steel has sold at the very low average of $62.00 a ton for building purposes.

The freight paid on all the steel shipped in to San Francisco since the fire amounts to $3,846,010.00. Two thirds of that went to the trans-continental railroads, the other third was divided between the American and foreign steamship companies. The railroads lost on the foreign material alone shipped in here $544,000; their loss from the American Hawaiian, $738,000.00 shipped via Tehuantepec.

That the local firms have secured four-fifths of the steel used since October in reconstruction was brought about, no doubt, by the home industry campaign that was instituted for the structural steel plants of the city a year ago last April. Home industry has helped them in the way that it forced them to show the local architects and contractors and the property owners that they did have the efficiency in the shops and the equipment to compete with eastern firms —that their equipment was not inadequate for such competition, as the eastern competitors claimed; but at what a demoralizing sacrifice as far as profit was concerned! The different shops, to get the business, cutting prices to bread and butter profits, forced the eastern competitors to bid only on the large jobs, while they fought it out with each other day by day, cutting their own throats trying to keep the small jobs. The result was, they were not content with a fairly decent profit and less work; they took heaps of work and smaller profits.

But even at that, some of the larger firms here bidding proportionately on an even basis with the smaller shops, secured the majority of the large contracts against eastern competition. They saved a little, perhaps, by using foreign steel. But still they were practically all losing money and still are when it is figured what the overhead costs amount to, and selling steel at $62.00 a ton average. How they live is marvelous under the prices they are getting, and it looks as though they were hanging on by "the skin of their teeth." Still, many of them feel quite confident that as long as business conditions pick up in the east and middle west, the eastern fabricators will be content to stay out of this field.

But even at that a change is noticeable in the buildings that are being put up now. The use of structural steel is decreasing, it seems, in favor of burnt clay products. More Class C structures are going up at the present time than ever before since the fire. The people apparently, in their forgetfulness of the results of the fire and earthquake, are becoming more confident and think less of the risk they are running in building cheaper structures—so the architects and contractors will tell you; which truth will naturally affect the structural steel firms that have not taken advantage of the great amount of steel erected in this city.

It seems that the railroads will not give the coast fabricators a differential, but with the recent reduction in the tariff on foreign beams they will be better able to compete on the same amount of work they are keeping already with a fairly decent profit, but with less business for the railroads that have already lost $400,000.00 by our local firms having bought 25,000 tons of foreign beams since the first of the year.

Since the beginning of reconstruction of the city in 1906, the cost of steel erected has been enormous, but the cost of human lives in finishing and erecting the steel has been an average of one man killed every two months, or 18 in all, with 298 wounded or severely hurt—52 men having been maimed for life.

The Valve Contract.

The bids on the valves for the city auxiliary fire system were again opened on Sept. 17 at the board of works office of the city. As a result of the previous opening of bids, the contract was given to the local firm (the Pelton Water Wheel Company) for a difference in price of $56,000 higher than that submitted to the Pittsburg Valve, Foundry & Construction Co. After the board of public works had awarded the contract to the Pelton company, the engineer's office demanded that an additional weight of over a million pounds of metal would have to be put in the valves. The Pelton company then withdrew.

The lowest total bid for the job was $358,099.00 from the Pittsburg company. On the 1,200 8-inch valves, the Pittsburg cmpany was the lowest, with $69,360.00; on the 590 10-inch valves, the Pelton Water Wheel Co. was low, with $58,250.70; on the 310 10-inch gate valves (with steel bands) the Pittsburg company was low with $33,325.00; on the 210 12-inch valves the Pittsburg company was low with $51,922.50; on the 100 12-inch valves Pittsburg was low with $20,020.00; on the 40 14-inch valves, the Pittsburg company was low with $10,160.00; on the 33 14-inch gate valves (with steel bands) Pittsburg was low with $8,059.00; on the 245 16-inch valves the Union Machine Co. was low with $80,115.00; on the 15 16-inch valves the Union Machine Co. was low with $5,197.00; on the 60 18-inch valves Pittsburg was low with $25,968.00.

The Pittsburg company secured more than half of the contract, or $223,000.00, the other two local firms, Pelton and Union Machine Co., $175,000.00. All of the firms bidding were local firms except the one from Pittsburg.

PUBLICATIONS RECEIVED.

THE MANUFACTURE OF COKE IN 1908.—By Edward W. Parker; advance chapter from mineral resources of the United States for calendar year 1908; 63 pages; Washington, D. C., United States Geological Survey.

COAL BRIQUETTING IN 1908.—By Edward W. Parker; advance chapter from mineral resources of the United States for calendar year 1908; 11 pages; Washington, D. C., United States Geological Survey.

PRODUCTION OF GAS, COKE, TAR AND AMMONIA AT GAS WORKS AND IN RETORT COKE OVENS AND OF GAS AND TAR AT WATER-GAS WORKS IN 1908.—By Edward W. Parker; advance chapter from mineral resources of the United States for calendar year 1908; 34 pages; Washington, D. C., United States Geological Survey.

THE PRODUCTION OF ABRASIVE MATERIALS IN 1908.—By W. C. Phalen; advance chapter from mineral resources of the United States for calendar year 1908; 20 pages; Washington, D. C., United States Geological Survey.

THE PRODUCTION OF ASPHALT, RELATED BITUMENS, AND BITUMINOUS ROCK IN 1908.—By Joseph A. Taff; advance chapter from mineral resources of the United States for calendar year 1908; 11 pages; Washington, D. C., United States Geological Survey.

NEWS FROM MANY INDUSTRIES

(In order to assist the post offices in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

New Buyers:—

The following manufacturing concerns have filed articles of incorporation:

Pennsylvania Pipe Coupling Co., Pittsburg; $5,000; by J. T. Swanwick, Monessen, Pa.

The Hohn Cement Machine Co., Indianapolis, Ind., $20,000; A. H. Byfield, C. W. Byfield, F. C. Hohn.

The Kennel Machine Co., St. Louis, Mo., $45,000; by O. M. Kennel and J Simpkins, coin controlled machines.

The Fidelity Motor Car Works, Sycamore, Ill., $25,000; by F. C. Binkley, Byron J. Snow and J. F. Waters.

The Eureka Cylinder Co., New York City, iron foundry; $50,000; H. White, F. C. Dohrman, W. M. White, Brooklyn.

The O. U. Handy Tool Co., Indianapolis, Ind., $10,000; workingmen's tools; by L. A. Browne; W. W. Spencer; E. W. Spencer.

W. O. Dray Mfg. Co., Denver, Colo., mining machinery; $50,000 capital; W. O. Dray, president; J. W. Crawford and Fred Douglas directors.

The Christianson Machine Co., Augusta, Me., $10,000; by Normal L. Bassett; Frank G. Farrington, and M. Brainerd, Augusta.

The Seamless Pressed Steel & Mfg. Co., Quincy, O.; $120,000; G. S. Gunderson, Otto Kolb, L. M. Gunderson, R. T. Haines, Lawrence Stoltz.

The Mansfield Steel Wire Works Co., Mansfield, O., $10,000; M. A. Blackburn, A. Kallmeter, Huntington Brown, Arthur Hughes, Peter A. Biddinger.

Boyd-Eastman Co., Baltimore, Md.; tools, machines, etc.; by William B. Boyd; 970 Park avenue; Harry D. Eastman, 702 North Gilmer street, and others.

The Great Western Automobile Co., Peru, Ind.; $100,000; by Milton Kraus, A. L. Bodruthe, W. S. Mercer, R. H. Bouslog, A. E. Myers, R. E. Edwards and Albert Kittner.

The Western Architectural Iron Co., Chicago; $15,000; ornamental iron, bronze, and brass metal; by E. T. Noonan, W. F. Cooling and Henry Morton.

The Peerless Heater Co., Ltd., Toronto, capital $40,000, to manufacture boilers and hot water heaters. Provisional directors: Andrew Dods, Gideon Grant and R. P. Stockton.

Stauft Coke Machinery Co., $10,000; treasurer, D. B. Stauft, Scottdale, Pa.; directors, D. B. Stauft, Sue M. Stauft, Scottdale, Pa.; J. C. Bryson, Menallen township, Fayette county, Pa.

Emaus Foundry & Machine Co., $5,000; treasurer, Milton Frey, Emaus, Pa.; directors, John H. Angeney, Allentown, Pa.; Milton Frey, Wesley J. Muth, Emaus, Pa.

The Saunders Car Stopper Co., Columbus, Miss; $250,000; to manufacture a device to be used instead of the old style bumper for stopping railway trains; D. R. Saunders, John T. Woods and others.

The Anti-Friction Wheel Co., Pittsburg, Pa.; wheels, tires, equipment and accessories for vehicles, $150,000; by Thomas Bernston and G. D. Williams, Pittsburg; George L. Lothner, Bellevue, Pa.

The Windsor Superior Mfg. Co., Ltd., Windsor, Ont., capital $40,000, to manufacture wares of metal and wood. Provisional directors: Walter Bong, Sherman T. Allen and John A. Smith.

Jeannette Machine Co., $12,000; treasurer, John Bennett, Jeannette, Pa.; directors, V. C. A. Kuntz, Hempfield township, Westmoreland county, Pa.; Frank S. Rode, John Bennett, Jeannette, Pa.

Pennsylvania Pipe Coupling Co., $5,000; treasurer, John T. Swainwick, Monessen, Pa.; directors, Edw. V. Anderson, John T. Swainwick, Wm. S. Bumbaugh, John C. Dries, all of Monessen, Pa.

The Sudbury Construction & Machinery Co., Ltd., Sudbury, Ont., capital $40,000. Provisional directors: John H. Clary, Geo. E. Buchanan, Geo. Burroughs, J. K. Maclennan and R. R. McKessock.

The Battery Light & Power Co., Ltd., Toronto, capital $50,000, to manufacture Gugler primary batteries, storage batteries and electrical supplies. Provisional directors: Wm. A. Schabel, Henry S. Dodd, Philip B. Wood, John H. Eddis and J. M. Wilson.

The Ohio Electric Car Co., Toledo, O., $75,000; by James Brown Bell, Henry P. Dodge, Rathburn Fuller, Harry E. Marvin, Robert R. Lee. A. M. Chesbrough is president; R. R. Lee, vice president; James B. Beel treasurer; Frank Suydam, secretary, H. P. Dodge, general manager.

New Construction:—

The Kissel Motor Car Co., Hartford, Wis., has decided on an increase of $200,000 in its capital stock and will erect a new building.

Work has been begun on an addition 80 x 40 feet to the foundry of the Reading Steel Casting Co., Reading, Pa.

Work has been begun on a building 63 x 120 feet for the Grupe Boiler & Drier Co., Davenport, Ia. The building will be provided with an electric traveling crane.

The Sioux City Iron Co., Sioux City, Ia., has recently taken a 10-year lease on a tract of land in that city adjoining its present quarters. The land is to be used for a warehouse for the storage of material.

The Corbin Screw Corporation, New Britain, Conn., is building a 6-story addition to its plant, which will increase the floor space about one-third. The building is so constructed that another story can be added if it should be needed.

The W. K. Henderson Iron Works & Supply Co., Shreveport, La., will complete its new foundry in about two weeks. The company will install two cupolas, cranes and molding machines which will be added from time to time as required.

The Arnold Construction Co. recently sent to Shreveport, La., 15 car loads of structural material and began work on the Kansas City & Southern railroad shops. The new shops will cost about $350,000, and will replace the old shops which are to be demolished.

The Toledo Steel Casting Co., which succeeded to the business of the C. E. Sutton Co., has begun work on the enlargement of its factory. A new traveling crane is to be installed, and it is expected to begin work on the new building in about two months. F. E. Meek, formerly connected with the Detroit Steel Casting Co. is manager of the Toledo company.

Architects have completed plans for the Quarry street plant of the Commonwealth-Edison Co., Chicago. The building is to be 200 x 220 feet. One building to be used in connection with this plant is already completed. When the new building is completed, the two will accommodate eight turbine engines to be used in connection with the old plant of the company.

The Allegheny Steel Co., Pittsburg, has let a contract to the United En-

gineering & Foundry Co. for the doubling of the plant of the Reliance tube department of the company, at Brackenridge, Pa. The new plant will be ready for operation the first of the year and the additions will give the company a capacity of 2,000 tons per month.

General Industrial:—

The Shelby Spring Hinge Co., Shelby, O., has increased its capital stock from $10,000 to $20,000.

The National Rolling Mill Co. is adding a new tin mill to its equipment at Mansfield, O., and also putting in a galvanizing kettle.

The American Brass Co., Buffalo, which was recently incorporated, has taken over the brass factory of the Work Casting Co. at Niagara.

The Grafton Machine Co. of Grafton, Wis., has filed an amendment to its articles of incorporation changing the name to Globe Foundry Co.

The Caldwell Bros. Co., Seattle, has secured the contract for the installation of the entire coal handling plant to be built by Andrew Laidlaw at Alberta, Canada.

The Keystone Tube Co. is now engaged in building a plant at Queens Junction, Ind. The main building will be 208 x 80 feet, with smaller buildings flanking it on each side.

The A. C. Perry Plow Co., Coldwater, Miss., a recently organized corporation with a capital of $5,000, was formed to take over the manufacture of agricultural implements formerly made by A. G. Perry.

The Wichita Mfg. Co., Wichita, Kans., is engaged in the construction of a foundry and building to be used as a machine shop. The company manufactures gas and kerosene engines, road crushers and pumps.

The Western Machinery & Foundry Co., of Milwaukee, which was recently formed with a capital stock of $25,000, will take over the business formerly conducted by Isadore Cohen, dealer in second hand machinery and factory equipment.

The Utah Mining & Machinery Supply Co., Salt Lake City, has increased its capital stock to $600,000 and changed its name to the Galigher Machinery Co. The management and the board of directors remain unchanged.

The Illinois Malleable Iron Co., Chicago has purchased four acres at the corner of Wellington and Paulina streets. The land adjoins the present site of the company and gives it about 20 acres. It was purchased for future requirements and no immediate building operations are contemplated.

The National Bolt & Nut Co., Pittsburg, Pa., has just completed additions to its plant at Sixty-first street and the Allegheny Valley railroad which will give a 25-per cent additional capacity in the hot pressed nut department. The capacity of the company is now between 5,000 and 6,000 kegs per month operating single turn.

Henry Disston & Sons, Inc., has just completed the first of a group of additions to its plant at Philadelphia, Pa. The new building is 180 x 80 feet, two stories high, to be used as a machine shop. The first floor is provided with a narrow gage railway track and a 10-ton electric crane. The whole building is supplied with electric power.

The Indiana Auto Parts Co., Marion, Ind., advises that it proposes to manufacture automobile parts, such as transmission steering gears, side levers and rear axles. The present plant occupies four lots, each 140 x 220 feet, and the foundry is now erected and in operation. The machine shop is not yet finished, but is expected to be within about three weeks. The company also has, in connection with its works, a 16-furnace brass, bronze and aluminum casting plant.

The Houston Mfg. Co., Rockford, Ill., which was recently incorporated, proposes to build and equip a factory for the manufacture of vacuum cleaners as soon as possible. The officers of the company are C. S. Brantinghan, president; E. P. Lathrop, vice president, and F. K. Houston, secretary and treasurer.

The Metzger Motor Car Co. was recently organized in Detroit with a capital of $500,000. The organizers of this concern are the same men who controlled the Everett-Metzger-Flanders Co., that was recently sold to the Studebaker interests. The new company has already secured quarters and is installing machinery. The company contemplates the addition of new buildings later on.

Consul W. Stanley Hollis has reported to the state department from South Africa on the exports of chrome ore from Beira, and states that the production is about 4,000 tons per month, most of which goes to Germany. The United States imported about 2,200 tons from that source during 1908, and the state department points to South Africa as a new source of chrome ore.

The Manitowoc Dry Dock Co., of Manitowoc, Wis., has absorbed the Gunnel Machine Co., of Manitowoc, and to carry the added business and provide for extensions, the capital stock has been increased from $200,000 to $350,000. The Gunnel company manufactures marine engines and equipment. E. E. Gunnel, an officer of the Dry Dock Co., is the founder and president of the Gunnel concern, but the two have been distinct up to this time.

President Kennedy Crossan, of the New Haven Iron & Steel Co., commenting on the annual report of that company, informed the stockholders that plans were now nearly complete whereby the company will begin the production of steel bars on a scale that will greatly increase the output of the concern. President Crossan says that plans have been under consideration for about six months, and that he believes the company soon will be in a position to undertake a great deal of business that it was formerly compelled to pass by. The annual report shows that gross sales in 1909 were only $276,717, against $552,451 in 1907.

The Fraser Lock Bar Pipe Co., with headquarters at 50 Church street, New York, is preparing plans for a plant and machinery for the manufacture of lock bar pipe from 20 to 84 inches in diameter, 30-foot lengths, and for making riveted steel pipe. The company will be in the market for some standard machinery but most of the machinery will be from special designs. The officers are C. J. McDowall, president; John Fraser, vice president; A. W. Krouse, secretary and treasurer. The officers together with Geo. P. Bard and R. T. McCormick constitute the board of directors. All of them except Mr. Fraser are connected with the Petroleum Iron Works Co., Sharon, Pa. Mr. Fraser is a mechanical engineer and head of a company now making a product similar to that which the new company will produce.

Fires:—

The foundry and machine shop of J. B. Henjum & Sons, Wells, Minn., was visited by fire Sept. 16. The loss was placed at $1,000.

The Eagle Iron Foundry, Salem, Mass., was damaged about $4,000 by fire Sept. 13. The loss was covered by insurance.

The Bath Foundry Co.'s machine shop and warehouse, Bath, Pa., were destroyed by fire Sept. 15.

The plant of the American Axe & Tool Co., Beaver Falls, Pa., was damaged by fire on the night of Sept. 16. The forge room, grinding room, engine room, packing room and one warehouse were involved in the blaze.

Damage reported to amount to $50,000 was caused by a fire in the plant of the Tips Foundry & Machine Works, Austin, Tex., Sept. 11. The company will rebuild.